Entrepreneurial orientation and network board diversity in network organizations

Joakim Wincenta,⁎, Sara Thorgren a,1, Sergey Anokhinb,c,2

a Luleå University of Technology, SE-971 87 Luleå, Sweden
b Kent State University, Kent State University, Kent, OH 330 672 1150, USA
c Voronezh State University, Voronezh, Russia

1. Executive Summary

Entrepreneurial orientation (EO) was first introduced as a firm-level concept, and scholars have analyzed EO exclusively at that level. We, however, suggest that EO should also be studied at other levels of analysis such as network organizations. This is a differently setting for the pursuit of EO. The influence of firms on network-level strategies is limited, and the strategy-making power and authority is vested within network governing bodies—the so-called network boards. This creates conditions for EO to manifest at the network level. We refer to this as network-level entrepreneurial orientation (NEO) and define it as the promotion of collective routines and conditions to offer opportunities for the network's firms to engage in joint endeavors to develop new innovations; experiment with frame-breaking renewal; commit to uncertain projects that potentially use new and existing resources effectively; and facilitate engaging the network's companies in proactive initiatives.

Development of NEO poses non-trivial challenges. For example, network member firms must accept that they have less power to influence entrepreneurial decisions than the collective governing body. The network board represents multiple stakeholders and aims to implement the best strategy for the entire body of participating firms. As such, board composition becomes a key factor that affects the development and promotion of NEO. Strategizing within networks is complex and could be further exacerbated by the complexities with the network boards themselves since boards have to reconcile political agendas of network members trying to protect their own interests. We outline how unique decision biases of network boards can influence NEO.

This study investigates how diversity among officers serving on network organization boards influences NEO. We extend the mainstream upper echelons reasoning meant for traditional corporate boards and top management teams to develop and test a
theory of how network board decisions influence NEO. Specifically, we discuss in detail how functional background diversity and inside/outside diversity facilitate NEO. While doing so, we suggest a moderating influence of board group tenure on the relationship between the two aspects of board diversity. We argue that the different qualities of functional background diversity and inside/outside diversity bring about divergence in thought and action. As a result, the influence of functional background diversity on NEO is strengthened in tenured board groups whereas the importance of inside/outside diversity for NEO is reduced in tenured boards. This highlights how the effects of different types of diversity change as boards attain tenure. Results obtained from a longitudinal analysis of strategic network organizations confirm our expectations. We conclude that board diversity is important for network boards and for entrepreneurial orientation at the network level.

Several theoretical and practical implications emerge from our findings. For entrepreneurial orientation research, we introduce, define, and validate EO at a network level (NEO), study a peculiar governance device that operates at the meso-level and is distinct from the mechanisms typically investigated, enhance the understanding of different types of diversity as boards attain tenure, and re-evaluate the relevance of the upper echelons framework in the network board context with respect to incentives, role enactment, and the collective striving of board members. For practice, our study is particularly useful because it assists in establishing a foundation upon which well-grounded decisions regarding EO at the network level could be made. The study also emphasizes that the strategy making process ascends from the sole firm level to the network level and that NEO is different from EO. This means that management should acknowledge that not all network member firms have to be entrepreneurially oriented to make the network organization entrepreneurial, and vice versa. As a result, this suggests a novel way of looking at the extent to which individual organizations need to pursue EO.

2. Introduction

The concept of entrepreneurial orientation (EO), which captures how decision makers build business routines and structural arrangements to support innovative ideas and creative projects, has been studied at the firm level (Lyon et al., 2000; Rauch et al., 2009; Wiklund and Shepherd, 2003). Over time, researchers have repeatedly emphasized the importance of developing high EO to promote new innovations and facilitate decisions that encourage proactive initiatives (Covin and Slevin, 1989; Lumpkin and Dess, 1996) and this has encouraged scholars to understand the factors that promote the development of EO (Lumpkin and Dess, 1996; Lyon et al., 2000; Wiklund, 1999).

The growing popularity of horizontal network relationships and the gradual shift of economic activity from the firm level to the network level bring to the fore the challenge of developing EO at the network level as well. We refer to EO conceptualized at this higher organizational level as network-level entrepreneurial orientation or NEO. Formal network organizations typically assign the task of developing strategy to the network-level governing bodies (e.g., the network board group) rather than any single firm (Das and Teng, 2002; Gulati, 1998; Uzzi, 1997). This group of decision makers ensures that collective routines and conditions offer opportunities to engage in joint endeavors commonly associated with innovation, risk-taking, and proactivity for the network’s firms. Although this places the EO discussion on another level of analysis, the challenge to develop EO remains and may become particularly daunting. For example, member firms must motivate collective actions yet consider politics to preserve some sense of individual interests and accept that they have less power to influence EO decisions. Indeed, the benefits of EO are meant to be shared among partners. Perhaps most important is that an individual firm depends significantly on decisions the board group enacts. Who participates in the network board, therefore, is an important issue to consider.

Previous research has demonstrated that top management and the composition of top management teams (TMTs) influence firm-level EO (see e.g., Auh and Menguc, 2005; Bruninghe et al., 2007; Gabrielson, 2007; Srivastava and Lee, 2005; Zahra, 1996; Zahra et al., 2000). Extending this logic to the network context, significant insights can be gained by studying how network board characteristics (something we assert resembles traditional TMTs) influence network-level EO. To investigate this notion, we isolate the influence of two types of network board diversity—insider/outside diversity and functional diversity—on NEO. We focus our research to diversity because it is the most frequently examined area in firm-level studies of upper echelons (Finkelstein and Hambrick, 1996; Jackson et al., 2003); thus, it could provide robust insight for theorizing at the network-level, where upper echelons reasoning and network board composition factors have not yet been studied widely (Provan and Kenis, 2007; Thorgren et al., 2009). We suggest that network boards are similar to the upper echelons of corporate organizations (Carpenter et al., 2004; Finkelstein and Hambrick, 1990; Hambrick, 2007; Hambrick and Finkelstein, 1987; Hambrick and Mason, 1984; Tuggle et al., 2010), such that their biases affect the kind of decisions they are likely to make. Yet, their potential biases differ substantially from those common among traditional corporate boards and TMTs. Indeed, possible biases include becoming a victim of the political agendas of network members with unequal motivation to contribute and protecting their own interests, which may interfere with developing NEO.

We contextualize the effects of network board diversity to show that the mechanisms driving the intentions and behavior of network boards differ distinctly from those at the corporate level. We advance Hambrick’s (1994) upper echelons framework in the network board context vis-à-vis corporate boards with respect to incentives, role enactment, and the collective striving of board members. We argue that the process to select the network board and the risks of orchestrating board members’ activities motivated by self-interest create unique dynamics that offset some effects of diversity but not others. In doing so, we contribute to the upper echelons theory (Finkelstein and Hambrick, 1990).

To date, whether the upper echelons arguments apply to this novel context has not been ascertained; we believe this is a gap in the literature. We also take this line of reasoning one step further and suggest it is important to consider the moderating effects of board tenure. Specifically, extending the upper echelons theory in this contextually unique setting suggests that insider/outside diversity has
its strongest positive impact on NEO when board tenure is low. In contrast, we suggest that functional diversity has its strongest positive influence on NEO when board tenure is high. Hence, different forms of diversity will be more or less useful as board groups attain tenure.

The conceptual development of the present study is tested in the empirical setting of network boards governing 53 strategic network organizations in Sweden over a 5-year period. We discuss the implications of this research for future studies of EO, elaborate on the effects of group diversity, and probe the boundary conditions of the upper echelons framework. We maintain that promoting NEO is an important area for future academic inquiry, because participating in network organizations opens new forms of EO. As such, a company’s benefits from NEO and innovation, risk-taking, or proactiveness that are typically associated with entrepreneurial orientation can be found beyond corporate boundaries. The corollary of the present study is that understanding EO must be broadened to acknowledge the strategy-making processes that occur outside the traditional unit of analysis; that is, the firm.

3. Theory

3.1. Strategic network organizations, entrepreneurial orientation, and strategy-making

Strategic network organizations, which link multiple partners that share common goals and accept network governance are common in practice, but are surprisingly under-researched (Human and Provan, 1997; Provan and Kenis, 2007; Provan et al., 2007). Network organizations are formed at a specific point in time to carry out specific network activities, and clear boundaries define the firms that are recognized as network members. These network organizations operate under umbrella trademarks, but the member firms remain independent. Member firms work together to develop new processes, products, and technologies and perform other large-scale tasks such as marketing programs that an individual firm could not accomplish on its own. As such, the foundation of the network is collective projects among multiple member firms that could improve the individual members’ competitive position.

In the present study, we examine the existence of EO in network organizations. In addition to the traditional firm or micro-level EO that has been studied widely, we suggest that EO may manifest at the network level as well. To date, however, prior research has neglected EO at the meso- and macro-levels. Although strategic choices with an entrepreneurial orientation can exist at many levels, in the present study we concentrate exclusively on the meso-level (network organizations).

We define NEO as promoting collective routines and conditions to offer opportunities for the network’s firms to engage in joint endeavors to develop new innovations; experiment with frame-breaking renewal; commit to uncertain projects that potentially use new and existing resources effectively; and facilitate engaging the network’s companies in proactive initiatives. Unlike firm-level EO, network-level EO (i.e., NEO) captures an orientation for collective engagement in joint endeavors associated with dimensions such as innovation, risk-taking, and proactiveness. In contrast to traditional firm-level EO actions, network-level innovation or renewal refers to creating new network business by re-working product offerings the network organization presents; identifying new markets for network-level offerings; exposing network offerings and member-owned technology based on new product developments or production facilities; and developing network units that own patents. Network-level risk-taking refers to boldness in promoting network experiments in which the outcomes are uncertain. These activities may invest substantially in entering new markets with the network organization or investing heavily in risky product development. Network-level proactiveness includes bold movements to explore new ideas that other network organizations or companies do not currently approach.

Several perspectives can be adopted to explain NEO. The proponents of embeddedness theory suggest that as the network matures, knowledge and information about focal network actors, their competencies, and their actions will spread through the network (e.g., Powell et al., 2005). As such, a bottom-up perspective could be used to examine NEO, and factors such as network trust and actual and potential high-quality partner links in the network may play an important role (Human and Provan, 1997; Wincent, 2008). At the same time, top-down processes that influence NEO are substantial. Network boards are typically instituted to coordinate and facilitate network operations and could potentially be a highly influential governance device (Provan and Kenis, 2007). Government agencies are often active in sponsoring and appointing board members because network organizations are considered a way to strengthen local entrepreneurship and regional development. The network board is a decision-making body with the potential to make an impact across member firms. Hence, network boards are not merely clubs, where issues with entrepreneurial content are discussed that potentially affect the firms in the network. Rather, the boards are responsible for developing strategy for the network organization. They plan and launch joint projects (Provan et al., 2007), and they solicit new project ideas from member firms. The key strategic choices embodied in NEO, therefore, tend to be in areas that reflect the activities pursued by network boards and not firm-level management.

The strategic choices network boards execute are similar to those discussed in top management literature related to EO, which suggests that opportunities can be pursued by purposeful enactment (Lumpkin and Dess, 1996). Consistent with the strategic choice paradigm, choices relate to those who hold power in an organizational setting and depend on the context in which the decision is embedded and the structure surrounding the decision. Much like corporate boards, network boards are decision actors that enable innovation, risk-taking, and proactiveness for the network. Network boards identify innovative opportunities for broader, multi-firm business concepts, develop large-scale, risky projects for the network, and find proactive ways that member firms can jointly approach competition. Specifically, the board develops the strategic decisions that combine the member firms’ collective efforts to explore creative approaches for trends such as global competition, enhanced product offerings, and large-scale innovation. These strategic decision-making processes extend beyond individual firm boundaries. In other words, whereas firm-level managers implement strategies for their individual products and markets, they do not control network-level strategic choices.

Although the power to enact EO shifts from firm managers to network board officers, the strategic decisions to pursue entrepreneurship at the network-level are still likely to embrace innovation, risk-taking, and proactiveness (Covin and Slevin, 2005).
Entrepreneurial orientation (EO) extended to a network-level. Table 1 summarizes the conceptualization of the commonly used EO dimensions at a network level, suggests how they may be linked to network board decisions, and illustrates how these may manifest in network organizations.

As noted, network boards make the network-level strategic decisions. Firm-level management, however, determines strategic choices regarding firm-level innovation, risk-taking, and proactiveness. Importantly, firm-level decisions are unrelated, to a great extent, to the strategic choices at the network level.

3.2. Network boards as upper echelons

Network boards are typically instituted to coordinate and facilitate network operations (Provan and Kenis, 2007) and share many characteristics with other governance devices. Yet they are distinct in important ways. As shown in Table 2, they share similarities with corporate boards and TMTs, but are still distinct from both. Strategic choices, and particularly enacting NEO, may be affected by the distinguishing characteristics of network boards.

Acknowledging similarities to corporate boards and TMTs suggests that upper echelons theory (Hambrick and Mason, 1984) can be applied to understand the effects of board composition on NEO. In corporate contexts, prior research has shown, for example, that inter-functional coordination is positively related to entrepreneurial orientation (Auh and Menguc, 2005), and that TMT size and heterogeneity, in terms of organizational tenure, are positively associated with being first-movers (Srivastava and Lee, 2005). Moreover, Brunning et al. (2007) suggested that outsiders on the board and large TMTs both have positive effects on a firm’s strategic change. Zahra (1996), in contrast, suggested a negative relationship existed between outsiders on the board and corporate entrepreneurship.

### Table 1

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<th>EO dimensions as conceptualized on a firm level</th>
<th>EO dimensions as conceptualized on a network organizational level</th>
<th>EO example on a network organizational level</th>
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<tr>
<td><strong>Innovativeness:</strong> When company-level management “engage in creativity and experimentation through the introduction of new products/services as well as technological leadership via R&amp;D in new processes.”</td>
<td>When network management make choices to introduce joint new products/services and R&amp;D processes in the network organization. This could be products but also patents that network units own. Network innovativeness does not simply reflect the accumulated number of member firms’ new products/services or their technological advancements. It specifically excludes products and services that member firms have developed on their own.</td>
<td>Member firms in a timber industry network organization all worked with sawn timber of a particular kind. The technology was changing rapidly in the industry and because the firms were individually small, they had a difficult time keeping up with the competition both nationally and globally. The network board decided to invest resources in building a patented sawing technique that featured radically different technically than the ones available on the market. With this new saw mill, the network organization became the technology leader in its industry. Although no single firm could be pinpointed as the single innovator, all the firms derived benefits from this joint innovation.</td>
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<td><strong>Risk taking:</strong> When company-level management is “taking bold actions by venturing into the unknown, borrowing heavily, and/or committing significant resources to ventures in uncertain environments.”</td>
<td>Similar to risk taking on a firm level, risk taking on a network level occurs when network management takes bold actions and/or commits significant resources in uncertain domains. It is different, however, in the sense that it is the network organization, not individual firms, that takes those bold actions and invests resources. The member firms may still share some of this risk, but it is only a fraction of the network’s risk.</td>
<td>One network organization took significant risks when investing resources to lobby for changes in the construction norms in the housing industry, which included hiring legal practitioners and people with connections to lobby for such changes on a national level. While no single firm would take such a risk with unknown outcomes, the network organization saw the opportunity and decided to invest network resources in an uncertain endeavor so that some network-level products to be launched.</td>
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<td><strong>Proactiveness:</strong> When company-level management has an “opportunity-seeking, forward-looking perspective characterized by the introduction of new products and services ahead of the competition and acting in anticipation of future demand.”</td>
<td>On a network level, proactiveness relates to network management’s preference to strive for the network to stay ahead of competition and future demand. Thus, network-level proactiveness captures introducing products and services that the member firms in the network organization developed jointly and the ambition of the network organization to be the first mover in their industry.</td>
<td>The network management in a network organization related to the timber industry decided to take pre-emptive action against the possible entry of new actors from low-wage countries. Whereas individually the firms could not outbid the low-cost entrants, as a network they were able to offer a comprehensive solution where member firms were adding smaller bits and pieces in a coordinated manner and thus changing the fundamental value proposition in their industry. They believed that such a solution, which was entirely new to the market, would be attractive to customers who make their purchasing decisions on more than just price. At the same time, the firms’ could continue their individual production without changes. This endowed the network with the first mover advantages in that segment of the market.</td>
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*Quotations are from Rauch et al. (2009: 763).*
Regardless of the direction of these relationships, the central premise of upper echelons theory is that TMT members’ experiences, values, and personalities greatly influence how they interpret the situations they face and, in turn, affect their choices and decisions (Hambrick and Mason, 1984). The effects of these characteristics depend on a set of essential elements in the corporate context. These elements include board members’ incentives and role enactment and the importance of securing organizational and collective interests. Hambrick (1994) reasoned that these elements are essential for understanding the influence of board composition on various outcomes such as entrepreneurial pursuits. It is evident, however, that network boards differ from corporate boards and TMTs in these elements.

As illustrated in Table 2, a network board’s work creates a dialogue among board members with a clear focus on solving problems and formulating strategy. Typically, however, network boards are composed of board members who serve on a voluntary basis (Provan et al., 2004). This limits the degree to which directors are likely to take responsibility for tasks and engage in roles needed to execute activities. As one network board member we interviewed stated, “…it is difficult to do something of nothing. I mean, some of…"

Furthermore, because compensation for participating and rewards for performance are limited, the motivation for extensive engagement may be low. Thus, few incentives exist for behavioral integration, board members may expend only the minimum effort a task requires, and will not aim to realize a project’s full potential with their presence. As one network board member explained: “Of course, I was assigned to prospecting how to work with this new technique and to check the interests of other member companies. To get some cooperation going. I live in the city, am well networked, and just want to provide a helping hand.”

Table 2
Comparing corporate boards, top management teams, and network boards.

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<th>What they are</th>
<th>How they execute their role</th>
<th>Regulations</th>
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<td>Corporate boards</td>
<td>Although there are varieties, the board is considered the formal link between firms’ shareholders and managers. The board has both a control function and a service function. It monitors management, but also provides advice and is active in formulating the firm’s strategy. In SMEs, the board averages six directors, and in larger corporations it averages ten directors. The directors can be divided into insiders (those who are employed full-time in one of the firms) and outsiders (e.g., lawyers, bankers, venture capitalists, or current or retired executives of other firms).</td>
<td>Laws regulate the role and structure of corporate boards. Important to note, however, is that there are national variations in these legislations (for example there are great differences on requirements for auditing and executive compensation).</td>
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<td>Top management teams (TMTs)</td>
<td>TMTs are teams of people holding top management positions in a firm. TMTs are responsible for making and implementing strategic decisions and for administering day-to-day operations. The operationalizations of TMTs differ across studies. For example, whereas some only include executives serving on the board, others are broader in their measure by including all executives holding senior-most offices (VP level and higher). This makes it difficult to compare the sizes of TMTs.</td>
<td>Law does not regulate their roles. Rather, each manager has a specific job description that the firm establishes, which details the responsibilities and expectancies.</td>
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<td>Network boards: a hybrid between corporate boards and TMTs</td>
<td>Network boards are a group of people that participates in the strategy making process for a network organization. Similar to corporate boards, they have both a control function and a service function. Moreover, they consist of both insiders (those representing network firms) and outsiders (those who do not represent network firms). Similar to TMTs, they are also responsible for implementing strategic decisions, but the decisions may be influenced by dominant members with strong self-interests.</td>
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Regardless of the direction of these relationships, the central premise of upper echelons theory is that TMT members’ experiences, values, and personalities greatly influence how they interpret the situations they face and, in turn, affect their choices and decisions (Hambrick and Mason, 1984). The effects of these characteristics depend on a set of essential elements in the corporate context. These elements include board members’ incentives and role enactment and the importance of securing organizational and collective interests. Hambrick (1994) reasoned that these elements are essential for understanding the influence of board composition on various outcomes such as entrepreneurial pursuits. It is evident, however, that network boards differ from corporate boards and TMTs in these elements.

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Furthermore, because compensation for participating and rewards for performance are limited, the motivation for extensive engagement may be low. Thus, few incentives exist for behavioral integration, board members may expend only the minimum effort a task requires, and will not aim to realize a project’s full potential with their presence. As one network board member explained: “Of course, I was assigned to prospecting how to work with this new technique and to check the interests of other member companies. To be honest, I believe I really did my best to get a picture. Had I been a consultant getting money to the extent I succeeded in convincing these guys, I would have convinced the other network members about the potential. But I think everyone understands the limitations with this network engagement. I don’t think disappointed anyone.” Our interviews also suggested other difficulties. While a board member’s motivation may be low for certain tasks, it may be difficult to unseat such a member once he or she has joined the board. Board members’ contributions to strategic choices may thus be motivated primarily by attempts to assure self-interest. This problematic issue is strengthened by the fact that board members who do not have specific self-interests may not attend board meetings. One of the board members we interviewed used a soccer analogy: “You cannot run after every ball you see; you need to pick the right one and score when you get your chance.” Obviously, when everyone acts only in self-interest, the creative potential of the board is limited.

Although the problems outlined above may not be present in all network boards, we suggest that they are highly likely to exist in a typical board. Drawing on the selection procedure through which network boards are composed, we reason that new members are
likely to carry interests that conform to the current interests of the network board. Moreover, once on the board, members are not likely to drop their engagement and will try to protect their interests by picking new candidates whose interests do not conflict with theirs. Another interviewee mentioned: “I was on the board when we invested in this new technique of cutting timber. I now use it in my company. If the network sells this equipment as some suggested, the quality of the products I am selling will drop. Not all network members understand the benefits. They may want to spend resources and engage in competing alternatives, but simply for that reason, I think the network would make a mistake by selling … Sure, you may say that I protect my company, but nevertheless, I am glad that the committee [the network board] knows the value of our equipment.” We posit that this problem could be reflected in lower NEO and that such board dynamics could create biases in strategic choices.

Effectively, we assume that the prior experiences of each top manager represent a “bag of tricks” that manifest in different perceptions, values, and beliefs (Hambrick, 2007). We believe it is likely that the bias in decisions that promote NEO may hamper the board’s ability to formulate a sense of vision and mission that could motivate the board members to make innovative, risky, and proactive decisions and to mobilize the network members for entrepreneurial actions. Moreover, strategic choice bias is likely to reduce effective internal information exchange and the mutual adjustments needed to use individual insights and energies to develop new knowledge. Furthermore, it could influence the collective understanding needed to experiment with responses to environmental trends, which could hamper the development of NEO. This, in turn, may suppress entrepreneurial initiatives among member companies. Finally, it is also likely that strategic choice bias could reduce the likelihood that directors with higher levels of expertise will discover and implement new solutions, because assigning responsibilities is fundamental for achieving competence-matching. This, too, would reduce NEO.

To this background, we suggest that carefully planning and composing the network board are an important issue. We do this in good faith that observable characteristics of TMTs such as background are proxies for psychological factors that have the potential to influence strategic choices. Next, we analyze the influences of two types of board heterogeneity—insider/outsider diversity and functional diversity—on NEO. We then develop the moderating effects of board tenure on these relationships to elaborate more clearly on how the key mechanisms manifest themselves in network boards.

3.3. Insider/outsider diversity and NEO

In the board literature, the distinction between insiders and outsiders refers to whether the board officer is employed by the board’s organization (Westphal and Zajac, 1995). On network boards, insiders are board members who are simultaneously TMT members in network firms, whereas outsiders are board officers who are independent of the network member firms. Insiders and outsiders direct their attention to different areas (Hambrick and Mason, 1984). Whereas insiders’ attention falls mainly to internal network conditions and events, outsiders’ attention is directed chiefly to external circumstances and changes.

Board composition in terms of insiders and outsiders significantly impacts the nature of board decisions (Wagner et al., 1998). Insiders tend to act based on the network’s inner workings and dynamics, whereas outsiders find motivational engagement from external sources. A network board composed only of insiders risks making strategic choices that are too focused on internal network conditions such that they neglect the external environment and its threats and opportunities (Fields and Keys, 2003; Fiet, 2007; Patel and Fiet, 2009; Thorgren et al., 2009). Moreover, because insiders in this context are likely motivated to participate based on opportunities to pursue own interests, a group consisting of only insiders is likely to become a coalition of political discussions that ensures self-interests. This would likely limit board members from pursuing bold and innovative entrepreneurial endeavors and developing projects that engage member companies and commit them to implementing decisions. Our interviews provided many examples in which technologies were significantly conserved because some members were interested in exploiting their current technology rather than re-orienting to unknown domains. Furthermore, insider domination may mitigate developing the trust and high-quality relationships between the board and network companies needed to present and implement entrepreneurial projects successfully.

Outsider-dominated boards, on the other hand, while seemingly free from self-interest-seeking behavior, risk making strategic choices that neglect internal conditions and could grow too distant from the actual network and the interests of member firms (Baysinger and Hoskisson, 1990). Outsiders are also unlikely to identify situations and constraints in contexts that could lead to creative breakthroughs. An outside board member we interviewed stated: “I could never contribute with competence to our discussion of what company X could do with its technology in China. Without the input of Mats [an insider], this great project would still be a dream.” As such, for network boards composed of both outsiders and insiders, diversity can provide nuances that engender creative discussions and subsequent decisions that are more balanced regarding self-interests. Therefore, mixing insiders and outsiders leads to monitored results and helps networks predict outcomes and manage resources more accurately (Dutton and Duncan, 1987). Within diverse boards, therefore, we expect more grounded, proactive, and risk-taking decisions that support innovations by liberating the board to create new combinations. Therefore, we predict:

**H1. Network board insider/outsider diversity is positively related to network entrepreneurial orientation.**

3.4. Functional diversity and NEO

Functional diversity—wide representation of individuals within distinct functional areas, such as marketing, production, research and development, finance, accounting, and corporate planning—is applied frequently in TMT research (e.g., Bunderson
and Sutcliffe, 2002: Waller et al., 1995) and is likely to be relevant for network boards as well. Network board members with varied functional backgrounds have different professional identities and differ in the knowledge they possess. Consistent with the upper echelons theory (Hambrick and Mason, 1984), they also possess hard-to-reach tacit knowledge and demonstrate selective perception (Dearborn and Simon, 1958). These differences may develop from different educations and work experiences that shape cognitions and perspectives. Boards with broader functional diversity have a greater breadth of experiences, knowledge, and perspectives (Bantel and Jackson, 1989). When identifying problems or changes, network board members (like any other individuals) are likely to use tacit knowledge. Thus, a highly diverse group ensures that the individual focus of one profession does not turn extreme and negate important issues (Hambrick, 2007).

Functional diversity can have its drawbacks, however. For example, with different functional backgrounds, board members may hesitate to discuss deep matters that apply to their tacit knowledge of their specific functional areas. Indeed, they realize that the topic primarily appeals to their own professional identity and believe others may not be able to process certain information to make the discussion meaningful (Bunderson and Sutcliffe, 2002). Furthermore, individual board members may find it difficult to accept support from those skilled in other functional areas (Wiersema and Bantel, 1992). Therefore, because functional background may make board members hesitant to share details related to their respective field, entrepreneurial decisions may be limited. Thus, the likelihood exists that both the number of opportunities identified and the willingness to take risks to proactively pursue opportunities may be reduced when directors have different functional backgrounds. Because the motivation to interact may be limited, functionally diverse boards may fail to act on some potentially high-quality opportunities.

Despite such problems, we argue for the overall positive effects of functional diversity on NEO. Armed with a broad base of tacit knowledge, boards characterized by high functional diversity can work with more complex approaches and solutions when solving problems (Bunderson and Sutcliffe, 2002; Cannella et al., 2008). This can be important for developing innovative alternatives and finding opportunities that trigger the entire network board to take risks and act proactively. The extant research lends significant support to this conjecture. For example, Bantel and Jackson (1989) reported that diversity in functional expertise was positively related to the level of innovation, and Wiersema and Bantel (1992) reported that team diversity in educational specialization was positively related to the intensity and scope of strategy change, indicating a propensity to be both proactive and take risks. Other research (e.g., Carpenter, 2002; Hambrick et al., 1996) has suggested that the capacity to manage uncertainty and environmental changes increases with functional diversity. Because these are major challenges for network boards, we expect functional diversity to be highly beneficial for developing NEO.

High levels of functional diversity also make it easier to pinpoint expertise and identify responsible persons with competence in different areas, which is needed to pursue creative solutions. This is important because a major challenge for network boards is to find and communicate responsibility for operative tasks and areas to be executed. Thus, within the board of an IT network we interviewed, members had severe difficulties assigning responsibility to launch a joint PR effort, because in that network board members only had technical and accounting expertise. Restructuring and expanding the board were necessary to identify a party who had competence in PR. Moreover, the problem of low incentives to attend board meetings among board members who have no self-interests to protect might be managed by calling on others with relevant expertise for different issues on the agenda. Ensuring that a variety of tacit knowledge is exchanged in the board room allows the board to initiate and pursue strategic choices oriented toward entrepreneurship, solve problems, and find creative alternatives. Assigning expertise to fix responsibility also addresses the reluctance to proactively pursue opportunities with more risks because it creates team competence and task efficacy (Jung and Sosik, 2002). It also signals the board is sufficiently professional to convince network companies to join and contribute to entrepreneurial projects. Therefore, we propose our second hypothesis:

**H2. Network board functional diversity is positively related to network entrepreneurial orientation.**

3.5. Moderating effects of board group tenure on the diversity—NEO relationships

Board group tenure refers to the extent the board experiences turnover (Johnson et al., 1993) and indicates whether the board is composed of the same members over a long period. Building on the specific characteristics of network boards (Table 2) and the processes behind board composition (Fig. 2), network board tenure may affect the positive relationships between the two types of board diversity and NEO. As with any board, it is likely that a tenured network board adheres to the status quo that develops because members are familiar and comfortable with their roles (Bantel and Jackson, 1989). Finkelstein and Hambrick (1990) suggested that such generic rigidity might be explained by board members' socialization into the group and the likelihood of being psychologically committed to their previous strategic decisions, which may escalate over time (Fox and Staw, 1979; Staw, 1981). Also, tenured groups tend to isolate themselves from novelty (Katz, 1982; Thorgren and Wincent, 2011), but become more similar in how they process information (Katz, 1982; Thorgren and Wincent, 2011), but become more similar in how they process information (Elenkov et al., 2005; Forbes and Milliken, 1999). Those that have highest incentives to contribute develop key positions in the group. While these general features of tenured boards are likely to be equally prominent in network boards, the specificity of network boards presents additional parameters to consider.

A tenured network board likely has all the conservative characteristics of tenured boards studied in corporate governance research. However, the selection process that network boards use and the extent to which they are motivated by self-interest,

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3 This occurs because board members are likely to identify significantly with a functional area. It does not apply to insider–outsider diversity, because that type of diversity does not evoke identity connections.
network politics, and voluntary participation creates dynamics such that the positive main effects from the two types of diversity are moderated by board tenure in opposite ways.

The prominent role of own interests and a selection process in which the core group of decision-makers stabilizes as the network board attains tenure (because they use their role to enjoy a “pay-off” from participating to satisfy self-interests and justify their voluntary participation), may make it difficult for the positive effects of insider/outside diversity to develop in tenured boards. For example, when tenured boards are selecting new members, the prominent insiders (i.e., network member firms) may prefer having “lame” outsiders that are unaware of what is going on in the network or, alternatively, insiders that support the current board agenda. This reflects the motivation to maintain power and influence over strategic decisions. In a tenured board, the core group members (typically insiders) know each other very well and are therefore strong gatekeepers. This limits what any new member can add and implies that most new members have no real power and influence over network visions and decisions. In our on-site observations and interviews, we encountered a persistent pattern in which the “core members” met outside the regular meetings to discuss network investments and ways to deal with emerging problems. The regular board meetings were then primarily called to rubberstamp the decisions that the core member clique had reached. As such, the selection procedure of new board members distorts the value of having diversity in the group. When insiders and outsiders do not interact optimally, the board becomes weak in terms of critically evaluating problems and questioning underlying assumptions. The diversity appears “on paper” only. Long-tenure board members admit that they often include outsiders to simply look better in the eyes of the governmental agencies that make funds available to the networks, and that insider/outside diversity is simply a window-dressing tactic they employ. Moreover, our interviews indicated that the mix of insiders and outsiders meant to increase trust and commitment between the network collective and the board (which is important for implementing projects that are innovative and risk-taking in nature) would not create such trust and commitment. Notably, network companies are well aware when core board members with self-interests set the agendas. Because efforts are needed to find new ways to approach existing problems and steer the network in a new direction by turning network member firms toward innovative, risk-taking, and proactive projects, there is a risk that the board’s decisions are not sufficiently innovative and creative. The positive effects on NEO from mixing insiders with outsiders are effectively lost, therefore, in a tenured board.

On the other hand, there are reasons to expect that network board tenure facilitates the positive effects of functional diversity on NEO. Because functional diversity captures different knowledge bases, and not necessarily different motivational interests regarding strategy, it is not suppressed as insider/outside diversity in tenured networks. A tenured board with high functional diversity will have characteristics that benefit conditions for better communication. This helps board members solve complex and challenging problems more effectively while aiming for innovation, risk-taking, and proactiveness. As in any board, interaction norms and shared language are established with group tenure (Amason and Sapienza, 1997; Carpenter, 2002). Such communication developments may benefit functionally diverse groups; otherwise, people from different functional domains tend to be unable to share complex information and interact effectively with those whose functional expertise differs (Finkelstein and Hambrick, 1990). Indeed, members from another functional area may not be able to absorb shared information (Bunderson and Sutcliffe, 2002; Van der Vegt and Bunderson, 2005). Yet when people share long-term experiences, such as being on a tenured board, they are more likely to interact effectively in solving complicated issues (Ensley et al., 2002; Wiersema and Bantel, 1992). For example, a tenured and highly diverse network board we studied used self-invented words and seemed to educate one another in their tactic knowledge. Based on their long history, they had clearly divided responsibilities and techniques to integrate their specialized knowledge. Their way of working challenged the board members to think creatively and instill the optimism needed to overcome obstacles and changes in entrepreneurial decisions, while also promoting the network firms to join innovative and novel projects that involved substantial risk. In this network, a board subgroup of engineers, a specialist in business law, and a professional PR specialist held several meetings and seminars during which they discussed entering a foreign market with network companies. Without this blend of expertise and the links that the board had developed with the companies, many of the company representatives would never have dared to join the bold project they ultimately decided to pursue. The positive side of diverse functional backgrounds, therefore, may be used more effectively in a tenured network board. We therefore suggest that the effects of the two types of diversity on NEO are moderated in opposite directions by board tenure:

**H3.** Board group tenure weakens the positive relationship between network board insider/outside diversity and network entrepreneurial orientation.

**H4.** Board group tenure strengthens the positive relationship between network board functional diversity and network entrepreneurial orientation.

### 4. Research methods

#### 4.I. Sample

We used data from strategic network organizations in Sweden to test the current study’s hypotheses. Network participation is common in the Swedish economy, and many firms are located in non-metropolitan areas with limited local markets—a context that makes local inter-firm relationships and entrepreneurship particularly important. Because such networks have existed in Sweden for quite some time, we were able to target a network population with significant variations in network board tenure and network age. Sweden, therefore, was considered an adequate empirical setting for the present study.
The network population was identified using a combination of lists and information obtained from local authorities at the county level, regional industrial development centers (IUC), and ALMI Företagspartner, a state-owned agency that supports networks among private firms. We also retrieved information about networks from NUTEK, a technology development organization that supports inter-firm networks. Based on information from these sources, we mapped all strategic small-firm network organizations in Sweden operating during the sample time frame (years 2000–2004), which amounted to 53 networks. The networks were moderate in size, averaging about 24 member firms and representing several industries in manufacturing and service (metal, wood, information technology, and tourism). A typical network board had five to six members, with just under half of the members classified as long-tenured (defined as more than a year of service). In terms of network age, most networks were started in the late 1990s, although some were considerably older.

We collected data by contacting representatives for each network who were key network board members and possessed detailed knowledge about network member firms and the activities and decisions made in the network boardroom. They all agreed to participate. As such, our choice of respondents was consistent with that of the majority of past EO research and the upper echelons literature, which has used a key decision-maker framework. Respondents provided data on the perceptual NEO measurement. In addition, they also gave us the secondary data and register files needed to test our hypotheses. Because the networks received state support, certain information, such as number of members, board composition variables, and other general descriptive information, including number of products developed, projects, and funding was archived. We were granted access to five years’ worth of data on the variables of interest, which enabled us to create a panel that reflected the temporal dynamics of the processes under investigation. This limited the risk of common method bias and limited respondent bias, while also providing an opportunity to compare the NEO measure with secondary data. Effectively, we work mainly with archival data and support our arguments with interview data as appropriate.

4.2. Variable definition and measurement

4.2.1. Network entrepreneurial orientation

To capture NEO, we employed an EO scale previously validated by Zahra (1996) that builds on several other studies including Zahra and Covin (1995) and the original entrepreneurship scale of Miller and Friesen (1982). When conducting pre-tests and searching for an appropriate scale to use, we discussed individual scale items with five network representatives. The Zahra scale was preferred compared to alternative scales such as the Miller and Friesen’s (1982) scale because from the network representatives’ perspective, it included less abstract items and thus had higher face validity. This said, note that Zahra showed his 1996 scale items were significantly correlated with items from the Miller and Friesen’s (1982) scale. Our measurements were based on a 7-point Likert scale that captured the networks’ innovation, risk-taking, and proactiveness. We thus captured NEO for each of the networks over the 5-year period studied. The major difference between our scale and the one Zahra (1996) used was that we re-formulated items by replacing the phrase “our company” with “our network” to reflect the network as an entity and to focus the respondents on joint network activities. To ensure that the scale applied in the network context, we pre-tested the items by interviewing representatives from the five networks. Although most items from Zahra (1996, Table 1) were found relevant, items 4 and 8 were dropped because networks cannot (or would find it technically hard) to acquire significant parts of firms in various industries or patents. We also dropped items related to strategic change of business units (items 11–14 in Zahra, 1996, Table 1), because they are not typically used in other EO studies. Moreover, these items caused confusion among the network representatives. They also expressed significant problems with face validity, which also gave us reason to omit them. The levels of NEO in our database were stable over time and averaged 3.42 on a 7-point scale.

We realize that some may argue that NEO could be captured by an aggregate of individual-level EO of member firms. We tested this potential approach with interviews. Importantly, the representatives of the five networks with whom we pre-tested the instrument strongly advocated against aggregating firm-level EO of individual network members to the network level. Instead, they suggested focusing on the EO behind collective network projects. They clearly distinguished between network entrepreneurship and firm-level entrepreneurship, indicating that network-level—not firm-level—entrepreneurship was their responsibility. Our measure of NEO, therefore, is intended to capture entrepreneurship embedded in collective projects and thus reflect the decisions the network board takes when functioning as a network TMT. In other words, our measure is not simply an aggregate of the individual firm-level EO of the network member firms.

We took several steps to ensure reliability and validity. As expected, we identified three factor components in exploratory factor analysis with varimax rotation in which the innovation factor accounted for 27.6%, risk-taking for 17.7%, and proactiveness for 14.5% of the variance. This supports that these dimensions could be identified in the measurement. Common factor analysis did not reject the use of a one factor solution ($p > .05$) and the reliability of this one-factor instrument was acceptable ($\alpha = .76$); therefore, in line with previous EO research, we collapsed the individual dimensions of the construct into a composite variable. Because these registers and archived materials provided detailed descriptions of the projects the network members undertook, we could evaluate individual dimensions of NEO for our respondents. Indeed, the registers helped us gauge the extent to which network projects were innovative.

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4 We excluded one network from our statistical analysis because that network incorporated representatives from all member firms on its board. This created problems both statistically (it became a very pronounced outlier) and also substantively, because the board formation process in that case diverged from the one described in our conceptual formulations. As such, our effective final sample size was 260 (=52 networks $\times$ 5 years).

5 Although highly statistically significant ($p < .001$), the correlation between firm-level and network-level entrepreneurial orientation was modest in absolute value ($r = .19$).
and were characterized by risk-taking and proactive actions. Thus, the ability to reference archival information provided us with superior quality information. It also substantially reduced the threat of recency bias and ensured that network performance in terms of its entrepreneurialism was assessed with the identical yardstick across all five years evaluated.

We also tested the convergent validity of our NEO variable by correlating it with alternative variables representing individual dimensions of the construct (innovativeness, risk-taking, and proactiveness). To capture innovativeness, we drew data from a register that reported the number of new products each network launched. Although the register had missing observations, it was sufficiently representative to assess convergent validity. The number of new products correlated positively with our measure of NEO. Interestingly, the correlation strengthened when temporal lags were allowed. Thus, it increased from $r = .23$ ($p < .001$) in the immediate perspective to $r = .30$ ($p < .001$) with a one-year lag to $r = .42$ ($p < .001$) with a two-year lag.

We next correlated the NEO variable with the funding that members invested in the networks, which we used to represent risk. Although this measure is not a clear-cut proxy for risk, we believe it captured the extent to which the network pursued bold endeavors and high-risk projects, as well as member firms’ support of such actions. The correlation was positive and significant ($r = .20, p < .01$). In other words, networks that are higher on NEO tend to pursue more projects simultaneously and thus could be considered more proactive. In sum, we believe this indicates that the (modified) EO scale could be used adequately in the network context and that the perceptual reporting of the NEO measurement is of high quality.

### 4.2.2. Board insider/outsider diversity

Board insider/outsider diversity was operationalized using Blau’s (1977) index as follows:

$$D = 1 - \sum_{i=1}^{s} \frac{p_i^2}{p_i^2}$$

where $p_i$ is the fraction of board members that represent either insiders (i.e., board members employed by any of the network member firms) or outsiders (i.e., board members independent of the participating network firms). The mean insider/outside diversity in our sample was 0.13, which suggests that board members are very much alike in this particular respect. Examining the data more closely revealed that boards included more insiders compared to outsiders. In fact, outsiders controlled less than 28% of a typical board. Although the insider/outside diversity remained stable across the years, a slight increase was observed in the share of outsiders over time.6

### 4.2.3. Board functional diversity

**Board functional diversity**7 with $s$ functions represented on the board was also operationalized using Blau’s (1977) index. Consistent with the commonly used conceptual definitions of functional diversity, this measure is based on the number of different functional areas represented in the board. Areas represented were marketing and PR, production, research and development, finance, accounting, law, and corporate planning. The input to the measure was in its original form reported by networks. We did not create our own clusters or functional classifications. Here, $p_i$ is the fraction of board officers that represent the $i$-th function. In theory, the index may vary from a low of 0 when all board officers share an identical functional background, to a high close to 1 when most board members have different functional experience. In our case, mean functional diversity was 0.58, indicating substantial heterogeneity in board officers’ backgrounds. There was no clear discernable temporal pattern in functional diversity dynamics over time.

### 4.2.4. Board group tenure

Network board group tenure was measured as the number of years required to replace all members of the board at the current replacement rate. Specifically, it was calculated as the ratio of board size to the number of new members installed on the board in a given year. To ensure that we did not introduce missing values to our data when no new members were installed on the board (i.e., to circumvent the impossibility of dividing by zero), we added unity to both the numerator and denominator of the ratio. We felt doing so was acceptable because network boards consider less dynamic were more likely to replace only one member at a time. Given the count nature of such a variable, this was the lowest substitution number possible. Obviously, both sets of estimates (with and without adding unity) were highly correlated ($r > .96$). While there is no way to know if indeed all members of all boards are eventually replaced (some of the more powerful members may stay on the board longer), the ratio shows the number of years a typical board may expect to maintain continuity through member retention.8 The average board tenure

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6 It is important to note that when only two categories are used to construct the Blau’s (1977) index (as is the case here), the index effectively behaves as a quadratic function (inverted U) of the proportion of insiders.

7 This reflects what Bunderson and Sutcliffe (2002) categorized as functional assignment diversity.

8 Our results hold if we use an alternative operationalization of board group tenure—the share of experienced directors on the network board group. This measure has the ability to capture the stability of group membership and could be thought of as board continuity: something that is prominent for the tenure arguments pursued in developing the present paper’s hypotheses (Bantel and Jackson, 1989; Finkelstein and Hambrick, 1990). According to this approach, a board is considered non-tenured if it replaces many board members annually, in which case the measure of tenure would be close to 0. A board to which no new members have been appointed is considered tenured. The tenure measure would equal 1 in such an unlikely case. Most boards naturally fall between these two points of the continuum. In our sample, the mean board continuity was 0.45, which indicates that slightly less than half of the board members were tenured.

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in our sample was 4.39 years. Although some temporal variance in this variable was observed over the course of years, no clear pattern emerged. We readily acknowledge that it would have been desirable to include more effective measures of board tenure such as the average number of years that various member dyads or triads within the board worked together. Unfortunately, we did not foresee this at the time data was collected, and we cannot calculate more refined proxies of tenure with the data beyond what is reported in this manuscript. We consider this one of the limitations of the present study. As noted in Footnote 6, however, when using the shared experience of directors on the network board group as an alternative measure of tenure, the results hold.

4.2.5. Control variables

We controlled for several network- and board-level variables that may affect our results. First, we measured the size of the network’s board as the number of members on the board (see Goodstein et al., 1994; Zahra and Pearce, 1989). Board education was operationalized as the total number of board members in each network with at least a university degree. These two variables were considered important because they captured capacity and the internal advantage for board creativity, both of which could affect NEO. Consistent with our reasoning that embeddedness and other effects may influence NEO, we accounted for the effect of network size, operationalized as the number of active member firms in each network. Indeed, access to resources may vary with network size (Provan and Kenis, 2007). This, in turn, may have implications for the relationships between board diversity and NEO. Furthermore, larger networks may have the opportunity to initiate more projects, which could drive NEO in the network boardroom. We also controlled for network age, measured as the number of years since the network formed. The average network age was 3.8 years, implying that a typical network was initiated between 1998 and 1999. In Sweden, this was an active period during which many strategic network organizations were formed. Still, about 35% of the networks were older than the average, with the oldest network being 43 years old by the end of the data collection period. Furthermore, we controlled for industry trends because previous research discusses the importance of taking industry type into account to avoid misleading results (Dess et al., 1990). The networks sampled belonged to wood product manufacturing, information technology, metal product manufacturing, and the leisure sports/tourism industries. We controlled for industry categorization using three dummy variables (wood, IT, metal), with leisure sports/tourism serving as a base category.

4.3. Analysis

Our data is a panel because it is built on pooled, cross-sectional, time series data. Such data cannot only improve the evaluation of causality, but it can also control for unobserved heterogeneity (omitted variables). We ran with the contemporaneous and lagged NEO. The results are largely consistent between contemporaneous and lagged DV models. The latter models were based on a somewhat limited sample size. In Table 4 we report the results for contemporaneous NEO.

Model 1 is a baseline comparison model that includes our control variables. We use them primarily to assess the incremental contributions of the more advanced Models 2 and 3. Model 2 adds functional diversity and insider–outsider diversity to the predictors to test Hypotheses 1 and 2. Model 3 tests Hypotheses 3 and 4 and accounts for the moderating effects of board group tenure as a moderator.

We selected the analytical strategy to improve the quality of the statistical estimates and to control for unobserved heterogeneity across the sampled networks used to test the hypotheses. When error structures are characterized by panel heteroskedasticity, panel autocorrelation, and contemporaneous correlation, feasible generalized least squares (FGLS) and Prais–Winsten regression with panel-corrected standard errors (PCSE) are the most suitable techniques to employ. This is because a regular fixed-effect estimator may not account for the error structure adequately (Blackwell, 2005). FGLS, however, may produce standard errors that lead to extreme overconfidence. PCSE, on the other hand, accounts for the panel structure and allows for heteroskedasticity, within-panel AR(1) serial correlation, and cross-sectional dependence, while being more conservative than FGLS (Beck and Katz, 1995; Greene, 2000; Kristensen and Wawro, 2003). As such, the PCSE method was employed to test our hypotheses.

Following the advice of Aiken and West (1991), we used standardized variables to reduce the risk of multicollinearity due to introducing multiple product terms into the regression. We performed multicollinearity diagnostics by examining condition indices. No evidence of multicollinearity was found. The condition number of 10.77 was below both stringent (15.0) and lax (30.0) cut-off values (Cohen et al., 2003). We also obtained VIFs by retesting our models with the OLS regression and specifying the cluster option. In the most involved model the mean VIF was 2.53 with the highest coefficient (that for board tenure) reaching 6.81—still much below the recommended cut-off value of 10.0. Accordingly, we conclude that multicollinearity did not pose a significant threat to valid statistical inference.

5. Results

Table 3 presents the means, standard deviations, and correlations among the variables used in the analyses. The correlational data confirms the expected internal board dynamics. First, it shows that the more tenured the board becomes, the larger it tends to be (0.68). This is consistent with the board member selection procedure we conceptually discussed previously: those who have been selected to be on a network board have an interest in staying on the board, although our further investigation of this relationship showed that this increase of the board size is non-monotonic, and years of increase are followed by years when
boards become leaner. Second, the correlation between board tenure and insider–outsider diversity (0.30) suggests that when new members are selected, there is a tendency to add outsiders with insiders. Third, the correlation between board tenure and functional diversity (−0.47) further indicates the conservative pattern we discussed.

Table 4 reports the results from the regression analysis of NEO on the control, main effect variables, and the interaction terms. The coefficients are stable and thus the models convey a consistent message. In Model 1, which includes only the effects of the control variables, we found that board size, board education, network size, network age, and the industry dummies significantly influence NEO. Model 1 explains about 10% of variance in NEO (as evidenced by the R²) and is highly significant as suggested by the Wald chi-square test (p < .001).

Model 2 adds the main effects of functional diversity and insider–outsider diversity to test Hypotheses 1 and 2. Model 2 explains 12% of variance in NEO and is characterized by a substantial improvement in fit statistics compared to Model 1 (p < .001). We found a highly significant relationship between board insider–outsider diversity and NEO (β = .10, p < .001), implying that Hypothesis 1 is supported. Functional diversity is also a strong significant positive predictor of NEO (β = .06, p < .001), providing support for Hypothesis 2.

Importantly, control variables retain their signs and significance established when testing Model 1. Board education is significant and positive as expected in Model 2 (β = .18, p < .001). Network size attains marginal significance in Model 2 (β = .13, p < .10). Network age is similarly significant, indicating that younger networks tend to be more entrepreneurial (β = −.05, p < .01). The same is true of board size (β = −.22, p < .01).

Next, we added the interaction terms in line with Hypotheses 3–4. The predictive power of the model moderately increased with R² reaching .15 (p < .001).9 As the Model demonstrates, the results are consistent with our conceptual development: whereas the effect of the insider–outsider diversity is negatively moderated by the board group tenure (β = −.20; p < .05), the moderation effect for board functional diversity is positive (β = .34; p < .001). This lends support to Hypotheses 3 and 4.10

To probe deeper into the relationships between board diversity and NEO we considered alternative operationalizations of the key variables. Thus, in Model 4 we replicated Model 3 but used a count of different professions represented on the board instead of the Blau-based diversity index. Key results are consistent with those reported in Model 3: The interaction of the number of functions represented on the board with board group tenure is positive and significant (β = .17; p < .01), much like the one in Model 3 thus staying consistent with our hypotheses. We also investigated unpacking the impact of the insider/outsider diversity by including the share of insiders and its square term in the set of predictors of NEO to determine if there was evidence for the inverted U-shaped relationship between board dependence/independence and NEO11 (see Model 5). A statistically significant negative square term for the share of insiders (β = −.14; p < .001) suggests that this was the case and that the board may be structured to maximize NEO. We plan to investigate this matter carefully in future research. We also investigated the interaction of the share of insiders and its square term with board group tenure. The relationships observed were consistent with our expectations in terms of sign, although the statistical significance of the effect dropped to the p < .10 level (results available from

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9 The increase in R² is modest. At the same time, improvement in the model fit was very significant. Adding the interaction terms results in the highly significant improvement of the model fit (Δχ²(2) = 16485.0, p < .001). In terms of the effect size, Cohen’s f² is .04, thus falling in between the thresholds for ‘small’ and ‘medium’ effects. Conservatively, we assess the effect size as small. The overall interpretation of these statistics taken together is that the effect clearly manifests in the population but its size in our sample is rather modest. As such, within this particular sample, we cannot do much better than Model 2 in terms of the variance explained. Rather, the true contribution of Model 3 is in uncovering the mechanisms behind NEO, as is attested by the significant interaction terms. 

10 Although very reasonable VIFs and condition indices suggest that multicollinearity is not present in our models, we also considered entering the interaction terms for testing Hypotheses 3 and 4 one at a time. Qualitatively similar results were obtained, although the interaction effect of insider/outsider diversity and tenure has lost in significance. For parsimony reasons, we do not report these results here. 

11 Another alternative measure we considered was the dependence ratio (ratio of insiders to outsiders on the board). Similar results were observed: the square term of the dependence ratio was negative and highly significant (β = −.39; p < .001). This lends further support to our arguments. We thank an anonymous reviewer for this suggestion.
Although the positive effect of insider group tenure moderates the positive relationships between the two types of board diversity and NEO in opposite directions. Suggest two key results: (1) network boards’ insider/outsider and functional diversity positively influence NEO, and (2) board conditions of network boards, and that network board diversity may manifest differently compared to the effects described in the board. We develop conceptual logic suggesting that the effects of board diversity on NEO depend on the unique contextual diversity and functional diversity are quickly gaining global popularity. We focus on the role that two dimensions of network board heterogeneity network boards as the key to unlocking entrepreneurial potential embedded in cooperative organizational arrangements, which is a dominant motive for forming strategic network organizations (Human and Provan, 1997). For quite some time, the literature on inter-firm cooperation, network organizations, and network management has emphasized that developing entrepreneurial strategy is no longer a sole firm issue and that network strategies can be as important as firm-level strategies in this regard (Human and Provan, 1997; Provan and Kenis, 2007; Provan et al., 2007). Identifying NEO provides researchers interested in EO with an opportunity to broaden their study domain. We demonstrate the authors on request). This is likely due to the overly refined partitioning of the variance (given the presence of the interaction terms with both the linear and quadratic terms).12

We used Model 3 to plot significant interaction effects. Figs. 1 and 2 illustrate Hypotheses 3 and 4. As the figures show, the influence of insider/outsider diversity on NEO is stronger in less tenured boards and weaker in highly tenured boards. Likewise, the effect of network board functional diversity on NEO is stronger in highly tenured boards and weaker in less tenured boards.

### 6. Discussion

The present study examines the role of network board characteristics for NEO in strategic network organizations. We view network boards as the key to unlocking entrepreneurial potential embedded in cooperative organizational arrangements, which are quickly gaining global popularity. We focus on the role that two dimensions of network board heterogeneity—insider/outside diversity and functional diversity—play in shaping the NEO and the extent these are moderated by the tenure of the network board. We develop conceptual logic suggesting that the effects of board diversity on NEO depend on the unique contextual conditions of network boards, and that network board diversity may manifest differently compared to the effects described in the mainstream upper echelons and EO literature.

We tested our developments by using data from 53 network organizations. The results obtained from analyzing panel data suggest two key results: (1) network boards’ insider/outside and functional diversity positively influence NEO, and (2) board group tenure moderates the positive relationships between the two types of board diversity and NEO in opposite directions. Although the positive effect of insider-outside diversity is stronger in less tenured boards, the positive effect of functional diversity is stronger in highly tenured boards. Managing NEO is thus a non-trivial issue because different types of diversity may be needed as the board attains tenure. Because it is difficult for any individual network member firm to influence NEO, the need for the board composition to be highly dynamic and actively managed seems to be critical. In contrast to traditional firm-level corporate boards and TMTs, the present study suggests that in this unique context, managing board composition dynamism is challenging.

Identifying NEO provides researchers interested in EO with an opportunity to broaden their study domain. We demonstrate that EO, originally developed as a firm-level concept (Lumpkin and Dess, 1996; Lyon et al., 2000; Wiklund, 1999), can also be applied at another level of analysis: the network level (NEO). Examining NEO in greater depth may represent an important stream of research. The number of alliances and network organizations is rising and pursuing innovation, risk-taking, and proactiveness is a dominant motive for forming strategic network organizations (Human and Provan, 1997). For quite some time, the literature on inter-firm cooperation, network organizations, and network management has emphasized that developing entrepreneurial strategy is no longer a sole firm issue and that network strategies can be as important as firm-level strategies in this regard (Human and Provan, 1997; Provan and Kenis, 2007; Provan et al., 2007).

12 Similar results (in terms of sign but not statistical significance) were observed when we used dependence ratio rather than share of insiders.
Contrary to the traditional EO approach, NEO implies a focus on the mesolevel, whereby any individual company has difficulty affecting levels of NEO. Instead, network board composition factors and biased decisions of the network board group become a key. This implies that companies striving to benefit from collective entrepreneurship processes need to rely on factors that are difficult to control. In traditional EO settings, board composition questions are much easier to manage compared to the network setting, where rules and guidelines for selecting and replacing members are less clear. Therefore, network politics and other factors that the EO literature has not examined become significant issues to consider. This further implies that companies need to re-assess and reconsider how to balance individual firm-level EO with NEO. Specifically, member companies could benefit from higher-level entrepreneurialism while maintaining a conservative stance at the firm level. The present study suggests that we need to pay attention to the interplay between the levels at which entrepreneurial orientation manifests. Perhaps some firms may see opportunities to pursue an entrepreneurial agenda while remaining fiscally responsible. This calls for studying the multi-level interplay of EO at the firm level and network organization and their joint impact on the strategic goals of both the firms and networks. Ultimately, one may also ask to what extent it is beneficial to pursue EO to increase company performance after controlling for NEO influences.

It also seems to be of utmost importance to study the extent to which network board composition may be influenced by network member firms. Can sustainable board compositions be found that promote NEO? How should individual-level EO decision makers integrate and consider higher-level strategy decisions for incorporating NEO into their decision making? Without considering the dynamic processes at the intersection of the micro- and meso-levels of EO, traditional company-level models of EO may fail to deliver when tested in the alliance or network context because entrepreneurial processes may take place beyond traditional firm boundaries.

Here, we have conceptualized the characteristics of network boards as a hybrid between corporate boards and TMTs. Researchers interested in studying network boards and TMTs at the meso-level, such as those found in network organizations, should consider contextualizing the arguments of the previously suggested upper echelons literature. This is the case because the mechanisms through which composition factors affect NEO may differ from those traditionally studied. Hambrick (2007)
indicated problems with decontextualization and emphasized that contextual embeddedness may influence key mechanisms and assumptions in upper echelons theory. The present study shows that revising core elements of the upper echelons theory is of highest relevance for understanding the development of NEO. We provide a unique theoretical platform for researchers interested in studying TMTs and boards of network organizations to build on and reveal the applicability and boundaries of upper echelons theory, commonly used to study corporate boards and TMTs. In the present case, we show that such a contextual approach to upper echelons reasoning enhances our understanding of diversity and its effects on NEO. Apart from the present study, previous findings suggest that the relationship between EO and insider/outsider diversity may be context-specific (e.g., compare Brunninge et al., 2007 versus Zahra, 1996). As such, our framework is a response to the large omission in previous board research with respect to considering the context in which top teams operate (Hambrick, 2007).

Finally, we add nuances to the diversity literature and illustrate why it is important to consider managing various types of diversity differentially as decision groups, such as those studied here, attain tenure. Insider/outsider diversity has its strongest positive impact on NEO when the board has low tenure. In our setting, we show that highly tenured network boards tend to “window-dress” when it comes to selecting outsiders who merely support the current agendas and are added to the network for nominal purposes, rather than branching to creative and innovative dialogues to initiate proactive decisions with high risks. Functional diversity, on the contrary, has its strongest positive effect on NEO when the board is tenured. Under these conditions, NEO gains from the superior ability of diverse board members in terms of specialized competencies who are comfortable exchanging deep information about their own expertise. We reason that a tenured network board consisting of volunteers driven by self-interest may be better equipped to overcome this communication hurdle. We believe this insight, suggesting that the moderation of tenure goes in opposite directions for the two diversity measures, is important for the diversity literature. Our results imply that as boards become more (or less) tenured over time, they should also adjust their composition by shifting from one type of diversity to another. Further research is especially warranted in study contexts such as ours, where board replacement falls victim to several complicated factors including an inbuilt unwillingness of existing board members to leave the board. Can such changes occur without influencing NEO? Does the influence on NEO matter if the board becomes more or less tenured over time? Acknowledging moderators has been requested but not yet addressed by the team diversity literature (Jackson et al., 2003; Van Knippenberg and Schippers, 2007). We believe significant, high-value insights for the understanding how to promote network-level EO could be obtained if such research is executed.

The present study has several implications for practice. Our results may provide guidance for composing network boards to facilitate network-level EO. To foster NEO, both functional and insider/outsider diversity are needed in various proportions depending on the board’s tenure. As such, our findings suggest the importance of proactively changing the board composition to manage NEO. When working with board composition, it is critical to remember that various forms of diversity may contribute differently to NEO and the specific conditions characterizing network boards groups compared to firm-level boards. Moreover, key contingency effects need to be acknowledged when thinking of network board composition and the applicability of different types of diversity measurements for mitigating potential decision bias of network boards. For example, for tenured boards, functional diversity is a more important characteristic than its insider/outsider diversity. The key, therefore, is to consider the very idea of contingencies in designing effective governance mechanisms for networks vying to increase their NEO.

Although the present study offers novel insights, it is important to note key limitations. The current study focuses attention on testing NEO. Although we followed careful procedures when testing the Zahra (1996) EO measure at a meso-level, we welcome further scale development. Although we reason and find that the classic three dimensions are likely to co-vary at the network-level, we realize the potential presence of other EO dimensions considered at the firm level, such as competitive aggressiveness and autonomy (Lumpkin and Dess, 1996). Consistent with the empirical study of Lumpkin and Dess (1997), we reasoned that competitive aggressiveness, defined as the intensity of efforts to outperform rivals, may not be a part of a reflective NEO construct. This is because in our context, competitive aggressiveness is a threat response and a reason for companies to group together in the first place. When forming a network, firms may not necessarily respond by innovating or taking intense risks. Instead, they may even pursue defensive actions. In addition, autonomy, which in one respect is the independent actions of individual companies to pursue visions or ideas, could exist in a network organization. Its relevance as a NEO dimension, however, is limited, as our pre-tests and interviews with network representatives suggest. Consistent with the entire idea that network organization relates to coordination (Human and Provan, 1997), NEO refers to coordinated collective actions by a top management group; as such, we believe autonomy is of limited relevance for studying NEO. In other words, although network organizations may exhibit both competitive aggressiveness and autonomy in a limited sense, we reason that they will not necessarily co-vary with innovativeness, risk taking, and proactiveness. Unfortunately, we did not measure these dimensions to assess the validity of our reasoning. Therefore, we believe these dimensions should be assessed in further studies.

In addition to working on refining NEO measurements, we encourage scholars to examine the decision making processes of individual network board members further. The extended upper echelons assumptions and theory propositions developed here are open for empirical validation and extensions. We believe observational research and interviews could be important for understanding of how board composition structure and board interaction interfere with NEO decisions. In line with studying board composition in other contexts, we could expect numerous contingency factors that could moderate or potentially mediate the influences studied here. For example, future research could capture the effect of environmental conditions, such as dynamism, competition, heterogeneity. It could also examine organization structure factors, including whether the network is structured organically or hierarchically. The effects of this factor could be captured by examining top-down or bottom-up network formation, the number of network member-firms, or the age of the network, which could proxy embeddedness. Finally, other groups of factors from the network board could capture decision processes and meeting structure (e.g., interaction frequency and
meeting agendas). Here, we focused only on a single limited group of factors when studying board diversity; thus, further research could extend our knowledge of how other board composition variables or characteristics such as ties or social capital influences NEO. Similarly, although we found significant effects of two kinds of diversity, we encourage studies of other types of diversity such as age and sex (Jackson et al., 2003).

Our research should also be a useful starting point for future research along other paths. For example, it would be interesting to investigate whether and how network board composition influences the outcomes of NEO. Previous entrepreneurship research at the firm level has reported that several factors moderate the EO–performance relationship such as firm size and industry (Rauch et al., 2009). In the context of network organizations, it would be relevant to study what effects NEO has on network performance/failure and whether or not those effects are moderated by the board composition, network size (e.g., the number of member firms or the sum of investments in the network), and the industry in which the network operates. A recent study by Bradley et al. (2011) demonstrated that slacking has a direct positive effect on firm growth, but also a negative indirect growth effect because of its negative influence on entrepreneurial management. Similarly, it would be interesting to study how possible slacking in the network organization affects both the network board characteristics–NEO relationship and NEO outcomes. Moreover, how does board composition affect the success of entrepreneurial projects or, alternatively, the network’s ability to recover from entrepreneurial mistakes? Other research has examined factors that influence learning from mistakes in the context of entrepreneurship (Shepherd et al., 2009). The present study can be extended to examine whether heterogeneous board composition also impacts recovering from potentially large-scale entrepreneurial failures that meso-level network organization has initiated and pursued.

In conclusion, the present study introduces and extends the EO concept to the network level and shows that the characteristics of a network board, in terms of functional diversity and insider/outside diversity can influence NEO. We hope our findings will spur further research on NEO and encourage the use of upper echelons theory at higher levels of analysis.

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