Network leadership: Defining its continuum

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ABSTRACT

Purpose – To comprehensively review the academic literature to date on network leadership in its various forms, and present a model on which type of leading a network is required in which context.

Design/methodology/approach – An initial gathered base of literature provided a solid starting point in retrieving and analyzing the relevant literature, for which an explicit list of keywords and selection criteria were adopted. Moreover, snowball sampling further diminished the chance of missing eligible records.

Findings - As differences in nature, level and context exist between the various forms of leading a network, a multi-dimensional scale of network leadership can be discerned. On the x-axis, this scale ranges from the inclusion of one focal leader towards total distribution of the leadership role; while ranging from an intra-organizational towards inter-organizational focus on the y-axis. Moreover, four meta-types of leadership, as based on all the studied antecedents and outcomes, were found to be applicable in specific network contexts.

Research limitations/implications – Only general databases have been used; no validation took place of the proposed model; further (empirical) research is urgently needed on the multi-dimensional scale, the model and network leadership in general. Many partly overlapping antecedents and outcomes must be integrated in new, large-scale longitudinal empirical research in this field.

Practical implications – The resulting leadership model is fulfilling the need for practical tools on how to lead various forms of networks.

Originality/value – The first comprehensive literature review on network leadership; the first multi-dimensional network leadership scale; and a unique model applicable in both research and practice about the choices of leading networks.

Keywords – Network leadership, shared/distributed leadership, network leadership theory.

Paper type – Literature review

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**Introduction**

The leadership field encompasses a fundamental and crucial component in organizational science. Over time, a vast amount of research established leadership’s linkage with outcomes as organizational effectiveness, employee job satisfaction, and voice behaviors (e.g., Braun et al., 2013; Detert and Burris, 2007; Bass and Avolio, 1994). That research for long focused on the perspective that leadership is only executed by single persons (Pearce and Manz, 2005). However, during the mid-eighties a research interest emerged for post-heroic leadership in which collectiveness and collaboration are stressed (Crevani et al., 2007). This is backed by practice in which sharing of leadership was already present before Christ (Sally, 2002).

In addition to the developments in the leadership field, inter-organization theory increasingly received scientific interest. That line of research focuses on the relationships between organizations, the transaction of resources between organizational bodies, and arrangements developed to ensure coordination (Kickert et al., 1997; Levine and White, 1961). Developments in society as well as the economy underline the importance of not only understanding leadership in organizations, but also within broader contexts (i.e., networks).

Based on the above, a multitude of fields around intra- and inter-organizational leadership in collaboration started to flourish alongside an ongoing focus on the hierarchical leader. Within this leadership literature, an area called network leadership emerged. This stream of literature around leadership in various forms of networks recognizes both shared leadership and the existence of a focal leader (Provan and Kenis, 2008). Whereas Bryson et al. first acknowledged this ‘network leadership’ in 1978 in their exploratory work “A political perspective on leadership emergence, stability and change in organizational networks”, the field experienced a quick increase in interest after 2005. The growing interest in this topic is emphasized by the leading journal “Leadership Quarterly”, which devoted a special issue on network leadership in 2016 (issue 2, volume 27). Also practice shows an increasing focus on networks and sharing of the leadership equation, with relationships between companies (i.e.,
inter-organizational networks) becoming more and more important. Phenomena such as the globalization of the economy, specialization, and the growth of mutual dependencies have led to an increasing amount of value being created outside the company and thus in their networks (Schumacher et al., 2008; Levine and White, 1961). Many firms are even present in multiple networks concurrently, with the growing complexity in the workplace demanding leadership that is to some extent divided between different actors (Uhl-Bien et al., 2007).

Among others, shared leadership and collaborative leadership are grouped within this higher order category of network leadership. Whereas some scholars adopt certain constructs interchangeably (e.g., James et al., 2007; Spillane, 2005), others stress that – subtle – differences exist between the constructs and thus should not be adopted as each other’s substitute (e.g., Yammarino et al., 2012). A high amount of ambiguity is therefore present in the upcoming field, which stresses the importance of further research.

Despite the different terms and definitions, most scholars seem to agree on four overall characteristics of why network approaches to leadership are highly relevant. Carter et al. (2015) in this respect provided an initial classification of network approaches to leadership in which the four characteristics are outlined. First, leadership is argued to be relational. Hollander and Julian pioneered in adopting a relational view by acknowledging leadership as a relational process and addressing problems of neglecting “the process of leadership” (Hollander and Julian, 1969, p. 389). The progression towards relation-centric views in the leadership literature shows an increasing focus on sharing the leadership equation. Second, leadership and how it is perceived is largely inseparable from the situation in which it occurs (Hollenbeck et al., 2014). Therefore, leadership is situated in its context (Carter et al., 2015). Third, leadership is patterned and uniquely developed between different dyads due to experiences, processes and context (Carter et al., 2015; DeRue, 2011; Lord et al., 2001). Lastly, leadership can be both formal and informal. As argued above, leadership can be
present in one designated leader, but it can also be collectively constructed in an informal manner (e.g., Follet, 1925).

All in all, this study aims to contribute to the network leadership literature in several ways. First, this study adds to the research stream in general by providing the first comprehensive literature review of network leadership. With this, a better understanding of the field and its many facets is gained. As (inter-organizational) network forms of organizing are increasingly needed due to the current dynamic nature of the workplace (Lappiere and Carsten, 2014), such knowledge is highly relevant. Second and related to the above, this study fills appointed research gaps by establishing an overview of both the antecedents and outcomes of network leadership configurations (e.g., Carter et al., 2015; Hiller et al., 2011; Zaccaro, 2007). Third, this study develops the first multi-dimensional scale of network approaches to leadership. Herewith, calls from the field (DeRue, 2011; Lord, 2001) are answered to move away from the static assessment of leadership in networks and include (contextual) discriminators that shape the constitution of the leadership role (Carter et al., 2015). Fourth, it offers structure and clarification within the evolving field by developing categorizations and presenting a definition of network leadership as based on the analyzed literature (n = 148). As ambiguity is high – for example on this definition of network leadership and the adoption of the different constructs (Spillane, 2005) – such clarification is urgently needed. Fifth, calls from Yammarino et al. (2012) are answered to build theory that simultaneously accounts network leadership outcomes as well as analyzing antecedents that moderate network leadership properties by proposing a model on which form of network leadership is applicable in which setting.
Resulting from the above highlighted research gaps in and calls from the literature, the following main research question has been formulated: “What constitutes network leadership and what types of network leadership exhibit a good fit with specific contexts (as shaped by both antecedent conditions and desired outcomes)?”

In order to address the main research question, two sub-questions have been established. First, only scant research addresses more than one of the various network leadership constructs, with ambiguities being present between these scarce studies. Carter et al. (2015) and Yammarino et al. (2012) opened some avenues for future research by conjecturing the multi-faceted nature of network leadership; though still being focused on specific sub-areas (e.g., social networks) and being heavily exploratory in nature. Therefore, this research aims to provide a thorough assessment of the various approaches to network leadership. In this respect, sub-question one has been formulated:

1. Which types of network leadership have been developed in the literature, and how do they differ in terms of their definitions, empirical assessment, adopted contexts etc.?

Besides, several researchers have – as discussed above – called for an analysis of the antecedents and outcomes of the various forms of leading a network in order to gain a deeper understanding of network leadership. This led to sub-question two, which comprises the following:

2. What are the differences and similarities between the relevant constructs in this literature review with regard to:
   a. Antecedents; and
   b. Outcomes?

The remainder of this article is structured as follows, and with that consecutively answers the research questions. Section 2 first provides a brief introduction to the literature on networks in general in order to sketch the prevailing ideas in the wider network literature. Then, section 3
discusses the methodology adopted for the literature review on network leadership. The following section, number 4, elaborates subsequently on the various constructs and their coherence. With this, answers are provided on sub-question one regarding the extent to which the constructs can be adopted conversely and their differences and communalities. This knowledge allows us to hereafter, respectively in sections 5 and 6, address the antecedents and outcomes of the various forms of leading a network as to examine whether differences exist between the constructs. With this, sub-question two is answered. Section 7 then discusses the model on which type of network leadership fits the context at hand and the objectives of the network. Lastly, some practical implications and strengths & limitations are highlighted; and areas for future research are sketched.

A brief introduction to network literature
Since O’Toole’s (1997) call to “treat networks seriously”, an increasing scholarly focus is present on networks and the adoption of the term (Hwang and Moon, 2009; Robinson, 2006; Borgatti and Foster, 2003). An abundant number of studies have been published on networks, their characteristics and effectiveness criteria, both in the public and private sector. However, as networks are difficult to measure, they are often assessed as a conceptual scheme, metaphor or management technique (“networking”) (Bergenholtz and Waldstrøm, 2011; Provan and Kenis, 2008; Milward and Provan, 1998). As this study limits to network leadership, the latter ‘networking as management technique’ is beyond scope and therefore excluded from further analysis. Networks on their own are moreover often assessed as a distinct organizational form, next to hierarchies and markets (e.g., Kickert et al., 1997; Powell, 1990). However, this three-fold division is too superficial as networks themselves might represent complex forms of hierarchies (Klaster et al., 2017). Inter alia due to those different perspectives, a vast number of definitions have emerged over the years. Whereas several studies focused on the relationship patterns between individual actors or so-called
“nodes” (e.g., Carter et al., 2015; Wasserman and Faust, 1994), other studies defined networks as consisting of organizations (e.g., Westerlund and Rajala, 2010; Provan and Kenis, 2008; Tsai, 2001; Benson, 1975). This study defines networks as entities consisting of three or more actors, being either inter- or intra-organizational with the existence of shared goals or interests. Various network classifications have been established and examined within the broader definition of networks, with at the highest level the general distinction between public and private sector networks. Public sector research again often employs a differentiation on the basis of policy (governance) networks and collaborative (service implementation) networks (Isett et al., 2011; Rethemeyer 2005). Other discriminations have been established on the basis of intra- vs. inter-organizational networks (e.g., Colombo et al., 2011) or the presence of a focal internal or external leader (e.g., Carson et al., 2007).

Whereas a multitude of classifications is present, a widespread agreement is about the importance of effectiveness (e.g., Turrini et al., 2009; Provan and Kenis, 2008; Provan and Milward, 1995). Evaluation of network effectiveness is essential since resources are scarce (Provan and Milward, 2001; Levine and White, 1961). However, effectiveness is generally labeled as hard to measure and define in detail, something that is found especially accurate in the context of networks (e.g., Provan and Kenis, 2008). As a result, and although an abundant amount of literature is available on networks, surprisingly little attention has been devoted to network effectiveness (Vollenberg et al., 2007). The scarce number of studies that did examine network effectiveness typically focused on the organization (case) level, instead of the network as a whole (Provan and Kenis, 2008). As network effectiveness is context-dependent (Kenis and Provan, 2009; Sydow and Windeler, 1998), defining general conditions is moreover complicated. Networks also often constitute of many different stakeholders, which are unlikely to be in consensus about the criteria that define the effectiveness of a network (Klijn, 2007). Generally, distinctions within this large pool of stakeholders are
conjectured on the basis of community, network, and participant (e.g., Fitzgerald and Turrini, 2009; Provan and Milward, 2001). While network effectiveness is likely based on interactions between the different levels, effectiveness at one level does not ensure effectiveness at another level or even conflict might be present (Provan and Milward, 2001). Though, certain contingencies (Drazin and Van de Ven, 1985) and factors are argued to contribute to or dilute the effectiveness of a particular network (e.g., Turrini et al., 2009; Provan and Kenis, 2008).

A classical division pertains to cost, time, and quality (Oisen, 1971). More recent research, however, added several additional effectiveness criteria such as network structure, trust, system stability, and integration mechanisms and tools (Powell, 1996; Turrini et al., 2009; Provan and Kenis, 2008). On top of this, leadership has been established as one of the precedents of network effectiveness (Turrini et al., 2009). The above outlined importance of network effectiveness and the explicit role of leadership in this clearly shows the significance of gaining a more in-depth understanding of network leadership. The subsequent research will focus on this network leadership, with which further discussion of networks in general and other effectiveness criteria is excluded.

**Methods**

The aim of this literature review is to provide a comprehensive overview of the available research on network leadership. In order to conduct this literature review, the grounded theory literature review method of Wolfswinkel et al. (2013) has been adopted. This approach consists of five iterative stages of reviewing: define, search, select, analyze and synthesize. The final search strategy is outlined in table 1.
Table 1: Final method adopted for the literature review

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Network leader*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Databases</th>
<th>Web of Science, Scopus, ScienceDirect; Google Scholar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search criteria</td>
<td>Topic/English/article or review</td>
</tr>
<tr>
<td></td>
<td>Text word/English/article or review/business, sociology, psychology, economics, public policy and administration</td>
</tr>
<tr>
<td></td>
<td>Text words/English/articles/full text/reviewed journals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results</th>
<th>Total number of articles retrieved: 1.741</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total number of articles scanned: 463</td>
</tr>
<tr>
<td></td>
<td>Total number of articles included in research: 148</td>
</tr>
</tbody>
</table>

**Define**

This stage includes setting the inclusion/exclusion criteria, identification of the fields of research, the approached databases and the specific search terms (Wolfswinkel et al., 2013). An initial base of gathered scientific work (n = 57) provided a solid starting point for analyzing the literature. During various iterative discussions between the researchers, the scope of the review’s search was established. This process also included the discussion and thereafter the establishment of the list of constructs being recognized. To be incorporated, a construct had to be 1) clearly focusing on leadership in network contexts; 2) discussing what this leadership implies; 3) repeatedly being cited and examined instead of seeming to be a one-off term; 4) scientifically related to the other constructs (i.e., the construct has to refer to network leadership in general or other constructs have to refer to the particular construct and vice versa). With this, the chance of missing or mistakenly including constructs was minimized. Nine different constructs resulted from the process. The search terms were then established on the basis of the included constructs, thereby also being coupled with adjectives.
(e.g., “effective”) and specific areas of interest (e.g., “outcomes”) so to aid in answering the research questions. Based on initial exploratory searches, Web of Science, Scopus, ScienceDirect and Google Scholar were defined as electronic databases.

**Search**
Extensive search was conducted between January and March 2017. No limitations to publication dates were adopted in order to derive an overview of the development of the research stream. Research from fields differing greatly from public and private business (e.g., biomedicine) and papers written in languages other than English were excluded. After the first round, “snowball sampling” by forward, backward and hand-searched citation screening was adopted to further prevent the exclusion of relevant articles. An initial base of 1,741 articles resulted.

**Select**
The titles, abstracts and keywords of the identified literature were then assessed. Eligible research records had to refer to:

- The use of the term “network leadership” in the right form (i.e., the often found “networking” as activity of leaders building a social network was excluded in order to prevent impurity of the results)
- Devoting a passage relevant to the topic, and thus discussing aspects of network leadership (i.e., not solely mentioning it as keyword or “network leadership should be present”)
- Research of sufficient quality. Lower quality literature (e.g. Bachelor theses or magazine articles) was excluded.

**Analyze**
The researchers then structurally screened the downloaded work, thereby consistently filling out a set up database. A special column was left blank for so-called “open coding” (for
example, see Keijser et al., 2015) in order to assure everything relevant to the research and the scope of the review was marked. During the analysis of the literature, regular meetings took place between the researchers. In these discussions, the content, implications and place of articles within the wider literature were discussed.

**Synthesize**

Lastly, the data was synthesized into higher order categories by a combination of discriminatory coding processes (i.e., integrating and refining concepts and themes) and axial coding (i.e., further development of categories). Original articles were consulted when the interpretation of the data needed additional and in-depth contextual information.

Afterwards, two additional coding schemes able to capture the full range of antecedents and outcomes of network leadership as discussed in the retrieved literature needed to be developed (Carsten et al., 2010). Qualitative coding with a method commonly referred to as ‘inductive analysis’ (e.g., Popping, 2015; Patton, 2002; Lee, 1999; Goetz and LeCompte, 1981) was adopted. This method enables the identification of codes “through an analyst’s interaction with the data” (Patton, 2002, p. 453). Those interactions include the creating and refining of a list of mutually exclusive codes in order to build theory able to explain a certain phenomenon (Katz, 1983), with this capturing the essence of the meaning of the data (Bowen, 2006; Morse et al., 1995; Strauss et al., 1990). Therefore, inductive analysis does not result in a phenomena being extensively explained, however it provides a solid starting point for building theory as is the aim of this research. In this way, 9 mutually exclusive codes for the antecedents and 12 mutually exclusive codes for the outcomes emerged.

With use of the codes that emerged from the data, higher order categories were then established. According to Lee (1999, p. 48) “the researchers create as many categories as needed to organize, explain, and assign data to these categories in a coherent fashion” during
an initial coding phase. This process was repeated until all codes were assigned to a category (Miles et al., 1994). Then, coding frequencies were computed in order to assess the support for all individual codes (Lee et al., 1999), and a thorough assessment of the mutual exclusiveness of the codes was executed. Categories that were only adopted infrequently were only retained as separate codes when no fit with existing codes or a correct revision of the existing categories could be established. Four categories emerged for both the antecedents and the outcomes. Afterwards, an additional higher order categorization was applied, resulting in a dichotomous division for the antecedents and outcomes. Appendices 1 and 2 show an overview of the categorized codes, including definitions and some examples.

**Analysis**

The final database of search results comprised a wide range of study types (e.g., meta-analyses, conceptual studies, empirical studies, conference reports, book chapters, dissertations). Moreover, numerous different contexts in both the public and private sectors (e.g., consultancy, education, governments) and different foci (e.g., effects) were included. This aided in establishing the first comprehensive review on network leadership; enabled a thorough assessment of both the antecedents and outcomes of network leadership, and with that the genesis of the model; and revealed the current research gaps.

**Results**

**The various forms of network leadership**

Many different constructs or ways of executing leadership – such as ‘democratic leadership’ and ‘shared leadership’ – can be categorized under the heading of network approaches to leadership (e.g., Carter et al., 2015; Yammarino et al., 2012; Carson et al., 2007; Mayo et al., 2003). Ambiguity is high as scholars often approach the constructs in a different manner, which has led to a diverse set of definitions and contradictions within the field (e.g., Yammarino et al., 2012; Uhl-Bien and Ospina, 2012). Whereas some research argues that
certain constructs can be adopted interchangeably (e.g., Kramer and Cresby, 2012; James et al., 2007), others stress that differences are present and constructs cannot be adopted conversely (e.g., Yammarino et al., 2012; Spillane, 2005). Disagreement also revolves around the level of sharing of the leadership equation. On the one hand, academics state that network leadership is a communal phenomenon executed to a higher or lesser degree by various network actors (e.g., Crevani et al., 2007; Gronn, 2002). On the other hand, a stream of research originates from the proposition that network leadership is not collectivistic and thus executed by an internal or external focal leader (Gronn, 2015; Carter and DeChurch, 2012). A few studies have been published on this equivocation, and examined differences between the various constructs that comprise network approaches to leadership (for example, see Yammarino et al., 2012). However, that work is often narrowly focused (i.e., centered around certain types of networks or only including very specific sectors) and merely discusses few of the extant constructs. Sporadically, researchers acknowledged that network leadership might be present as or in networks (Van Wart, 2014; Contractor et al., 2012). Carter et al. (2015) were the first to examine this two-fold division in their integrative conceptual review of social networks. In the case of leadership in networks, a focal leader carries out the leadership responsibilities. Contradictory, leadership as networks acknowledges the division of the leadership equation over multiple actors in the network. Carter et al. (2015) with this provided a solid starting point by adopting a mere generic view of network leadership, however they did not explicitly denominate the different constructs adopted in their research. The above underlines the urge of gaining in-depth understanding of network leadership. In order to address the first sub-question, the following constructs – as recognized during the defining process (Wolfsinkel et al., 2013) – are briefly assessed: shared leadership; distributed leadership; complexity leadership; democratic leadership; intergroup leadership; collaborative leadership; collective leadership; participative leadership; network leadership theory.
number of retained articles per construct is outlined in table 2 below. It should be noted that the number of articles retrieved per construct reflects their scientific interest, which thus differs across the various forms of network leadership.

Table 2: Number of retained articles per network leadership construct

<table>
<thead>
<tr>
<th>Network leadership construct</th>
<th>Number of retained articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared leadership</td>
<td>33</td>
</tr>
<tr>
<td>Distributed leadership</td>
<td>24</td>
</tr>
<tr>
<td>Complexity leadership</td>
<td>10</td>
</tr>
<tr>
<td>Democratic leadership</td>
<td>8</td>
</tr>
<tr>
<td>Intergroup leadership</td>
<td>7</td>
</tr>
<tr>
<td>Collaborative leadership</td>
<td>19</td>
</tr>
<tr>
<td>Collective leadership</td>
<td>17</td>
</tr>
<tr>
<td>Participative leadership</td>
<td>14</td>
</tr>
<tr>
<td>Network leadership theory</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>148</strong></td>
</tr>
</tbody>
</table>

Shared leadership
Most pronounced within the category of leadership as networks is shared leadership, which is defined as “a dynamic interactive influence process among individuals for which the objective is to lead one another to group or organizational goals, or both” (Pearce and Conger, 2003, p. 1). Contrary to most other constructs, several meta-analyses have been performed on this type of network leadership and its linkage with team performance (e.g., see D’Innocenzo et al., 2014; Nicolaides et al., 2014; Wang et al., 2014). Empirical work has been published on the process (e.g., density) of shared leadership (Zhou, 2012; Crevani et al., 2007, Carson et al., 2007; Avolio et al., 1996), and antecedent conditions (e.g., Hoch, 2013; Carson et al., 2007, George et al., 2002). Being considered as an intra-organizational team or group property (Chiu et al., 2016; Li et al., 2008; Carson et al., 2007; Ensley et al., 2006), scarce attention is devoted to inter-organizational contexts. Focal leaders appear to be absent in these shared leadership contexts (e.g., Crevani et al., 2007), while the relational nature is stressed by the mutual influence of group members (Chiu et al., 2016). This relational nature enables
dynamic interactions in which roles are rather fluid, resulting from the personal competencies of actors suiting the specific task at hand (Li et al., 2008; Klein et al., 2006). An increasing scientific interest arose after 2007, with scientific attention accruing yearly.

**Distributed leadership**
Distributed leadership comprises another construct addressing leadership as networks, and is often discussed together with shared leadership (e.g., Gronn, 2008; Mehra et al., 2006). Gronn (2002) is considered the patriarch of this research stream that examines the dispersion of the aggregated leadership role across some, many or all of the network members. Over the years, scientific interest rose, with rapid increases faced after 2008. The construct is conceptualized as a concertive and conjoint effort of a group or network of individuals (Currie et al., 2009; Bennet et al., 2003; Gronn, 2002). Although several scholars excluded the presence of a focal leader, a central leadership node is regularly present in the network (e.g., Fitzgerald et al., 2013; Currie et al., 2011; Bolden, 2007). Those networks transcend the level of teams and comprise the wider organization (e.g., Heck and Hallinger, 2010; Gronn, 2002). However, characteristics of the inter-organizational context are not explicitly taken into consideration. A remarkable number of studies have been conducted in the context of education, focusing on the distribution of leadership from school principals to other actors (e.g., Bolden, 2011; Heck and Hallinger, 2010; Currie et al., 2009).

**Complexity leadership**
Complexity leadership resides from the idea that current organizations are often too complex for leadership tasks to be executed effectively by a single actor (Uhl-Bien and Marion, 2009; Lichtenstein et al., 2006; Marion and Uhl-Bien, 2002). Within the field, a shift is argued from the industrial age to a knowledge era in which the top-down leadership paradigm no longer fits (Uhl-Bien et al., 2007). Designated leaders are thus not often in place. Instead, leadership stems from complex interactive dynamics around certain roughly specified and desired outcomes that often include a learning component (Hill, 2009; Lichtenstein et al., 2006; Uhl-
Bien et al., 2007). Due to the focus on complex interactions, larger scale and with that inter-organizational or even inter-cultural relationships might be present in the network (Coveney, 2003). Being a relatively new stream of research that only gained substantive interest after 2007, much of the work is on a mere conceptual level rather than empirical.

**Democratic leadership**
A concept that has been present in the leadership field for a longer period of time is democratic leadership. Despite its longer existence, most of the scholarly work has a conceptual or exemplary nature (Choi, 2007). Much of the research has been conducted in the educational context, with the existence of democratic leadership in inter-organizational contexts only sporadically being recognized (e.g., Choi, 2007; Gastill, 1994). As the name predicts, the fundamentals of this construct revolve around the classic democratic processes and principles as inclusiveness, self-determination and equal participation (Gastil, 1994; Fishkin, 1991; Dahl, 1989). Democratic leadership has therefore been defined as the behavior that influences the people in the network in a manner that is consistent with democratic principles (Fishkin, 1991; Dahl, 1989). Nevertheless, democratic leadership is not equivalent to fully sharing the leadership equation (Spillane, 2005), with a focal leader often in place. According to Gastill (1994), democratic leadership is about performing three functions: distributing responsibility among the actors; aiding the group’s decision making process; and empowering the group members. Contrary to the other constructs, the scientific interest for democratic leadership has decreased over the last years.

**Intergroup leadership**
Intergroup leadership represents a less known component of the leadership as network umbrella. This relatively new construct received far less scientific attention than most of the other constructs, of which the vast majority also only has a conceptual nature. The existence of a designated leader that promotes collaborative performance and positive intergroup relations between different organizational groups or organizations is widely acknowledged
(Hogg et al., 2012; Pittinsky and Simon, 2007). The construct thus explicitly recognizes an inter-organizational context, in which the relational nature of the collaboration is stressed. However, groups might also stem from within the organization (Hogg et al., 2012).

**Collaborative leadership**
A construct that is often adopted jointly with shared leadership and which has steadily gathered scientific interest throughout the years is collaborative leadership. Whereas collaborative leadership scholars believe that true participation in the leadership equation is expected from all team members (Morse, 2008; Raelin, 2006), a focal leader – who must be prepared to allow sharing power – is often present (Zander and Zander, 2002). Collaborative leadership is defined as the situation in which a (inter-organizational) workgroup is truly active in leadership, thereby taking advantage of individual and group competencies (Raelin, 2006; Finch, 1977; Morse, 2008; Herrington, 2000). Scarce scientific attention is devoted to quantitatively analyzing the construct, with most of the work being either conceptual or qualitative (Kramer and Crespy, 2011).

**Collective leadership**
A high amount of incongruence is present about the interpretation of collective leadership. On the one hand, a group of scholars emphasizes that a focal leader effectively distributes elements of the leadership role within a network (e.g., Margolis and Ziegert, 2016; Yammarino et al., 2012; Friedrich et al., 2009). On the other hand, others within the field of research reject the existence of a leader altogether, stressing its relational nature and the sharing of leadership responsibilities (e.g., Contractor et al., 2012; Hiller et al., 2006, Gauthier-September, 2006). Collective leadership is assessed within a broad range of contexts from teams to broad networks, and within a wide array of sectors including health, manufacturing and the public sector. With the exception of democratic leadership, this field also experienced increasing scientific interest throughout the years. However, the relatively
large share of quantitative research published is in contrast with the other constructs that are often mainly conceptually based.

**Participative leadership**
While the term ‘participative leadership’ already had been coined in 1947 (Platt, 1947), broad adoption only started after the millennium. Participative leadership aims to increase members’ participation by transferring influence, autonomy, attention and discretion, and empowering group members in problem solving (Lam et al., 2015; Huang, 2012; Huang et al., 2010, Kahai et al., 2004 Bass and Stogdill, 1990). A focal leader is present in this participating process that is mostly assessed as intra-organizational (e.g., Huang et al., 2010; Jago and Vroom, 1982). Though the scientific literature is not abundant, a relatively large part is quantitatively based and focuses on the outcomes of participative leadership.

**Network leadership theory**
The final form of network leadership is not collectivistic (Gronn, 2015; Carter and DeChurch, 2012). In contrast to the ample amount of literature published on leadership as networks, scarce attention is devoted to this relatively new and individual approach. This latter fact is striking as the leadership field historically conjectured the existence of a heroic leader (Pearce and Manz, 2005). This so-called NLT (Network Leadership Theory) focuses on the leader in the network, how this leader impacts the network and is influenced by the network, and the relational nature of interactions within the network (Ospina, 2016; Carter and DeChurch, 2012, Yammarino et al., 2012; Silvia and McGuire, 2010; Balkundi and Kilduff, 2006). Despite the fact that the focus is on a focal leader, a collaborative style is advised (Van Wart, 2014). The construct views both leader and follower attributions as system properties, in which influence linkages define the relational structure (O’Leary and Ospina, 2016).

**Discussion of the different constructs**
As previously noted, various constructs are to a greater or lesser extent discussed concurrently. Some terms are even adopted interchangeably, such as shared, distributed,
collective and collaborative or, on the other hand, democratic and participative leadership. In this, shared leadership and distributed leadership are most often adopted conversely. However, whereas shared leadership is solely focused on the team level in which focal leaders seem to be absent, distributed leadership considers the broader organization with a designated leader regularly being in place. While sometimes being connected to the two above discussed constructs, collective and collaborative leadership are also often discussed as a pair. Collaborative leadership is relatively unambiguous, with the existence of a designated leader who – resulting from the personal competencies of the actors – yet shares the leadership role to a high degree. In contrast, collective leadership appears to be an all-purpose concept and is with that highly ambiguous on several aspects such as the inclusion of a focal leader, its definition and adopted contexts. Participative and democratic leadership also often intermingle, and do not differ extensively. Both sporadically adopt an inter-organizational context and include a focal leader. However, where the focus in democratic leadership is on democratic principles in general, participative leadership focuses on active participation of the network members (e.g., Huang et al., 2010). Their relatively long existence is something participative and democratic leadership have in common. While the other constructs only gained substantive scientific interest after the millennium, both democratic and participative leadership were already discussed in the literature before the 1950s. The amount of democratic leadership research has even been decreasing over the last few years, thereby sharply contrasting the other constructs’ yearly increase in publications. Remarkably, this elder stream of literature around democratic leadership shares its vast contextual focus on education with the mere recent and thriving field of distributed leadership.

The above analysis highlights that, among others, differences in context, nature and level exist between the different constructs. Therefore, a clear-cut separation does not seem to be applicable, with the execution of the leadership role being most prominent in this. As can
be concluded from the above analysis, shared leadership and NLT represent two extremes with respectively excluding the existence of a focal leader altogether or consistently discussing the presence of a designated and focal leader. However, the other constructs all recognize to a higher or lesser extent that single persons execute the leadership role. This represents an interesting result as network leadership thus not only includes the presence of a focal leader or total sharing of the leadership equation, but also covers the total discrepancy between the two extremes. A two-fold division would therefore represent a too narrow view of the broad scope of network leadership. Rather, the constructs seem to represent a continuum. Based on the above, figure 1 represents this continuum of network approaches to leadership. The two extremes of the spectrum, having a single focal leader or leadership being widely dispersed, are respectively embodied by NLT and shared leadership. Distributed leadership symbolizes the center of the continuum, with a focal leader in place in around half of the cases. What stands out is the fact that the vast majority of the constructs revolve around the left hand side of the spectrum, thereby thus tending to the inclusion of a designated leader. Being positioned on the widely dispersed side of the spectrum, only complexity leadership and shared leadership represent an exception to this. Thus, the literature on network leadership in general seems to embrace the existence of ‘leaders’ in the network context. This stresses the importance assigned to these focal leaders in scientific research.

However on this sliding scale and additionally, a general four-fold division can be drawn. As collective leadership is highly ambiguous, this stream of network leadership research is excluded from this general division. First, shared and complexity leadership can be considered as a couple since both to a high extent embrace the sharing of power in contexts where a focal leader is often absent or plays a subordinated role. Second, a designated leader that heavily shares or distributes the leadership equation over the different actors is present in distributed and collaborative leadership. Third, democratic and participative leadership can be
considered as another couple as they highly value empowerment and expect active participation of all members, which however not equals to sharing of the leadership equation. Lastly, a focus on a well-established focal leader is reflected in the last couple consisting of NLT and intergroup leadership.

Figure 1: The continuum of network leadership.
Note: Figure 1 is based on a detailed Excel-file including a column for the existence of a focal leader per study (n = 148). The percentages including a designated leader per construct resulted in the interval scale (left 100%, right 0%) presented in the figure.

Besides the presence of a designated leader, another important difference in the seemingly similar terms is the sole focus on intra-organizational relations or the inclusion of inter-organizational networks. Although the importance of inter-organizational networks is stressed (for example because complex problems cannot be solved in isolation) in the general network literature as well as in practice, the number of studies that explicitly includes an inter-organizational context is remarkably low. The two oldest constructs, participative and democratic leadership, only sporadically adopt a broader context than the intra-organizational level. Also the two most well established constructs, shared and distributed leadership, focus on a more limited scope. In this, shared leadership even mostly assesses the team level, whereas distributed leadership adopts a wider perspective including the broader organization. A second axis is therefore added in figure 2, which represents the distinction between the intra-organizational context and the inter-organizational context. Together, these axes represent two noteworthy contingencies on which the constructs can be divided. Figure 2 visualizes the mostly intra-organizational focus of network leadership. Where collective
leadership takes into account both views, only complexity leadership, intergroup leadership and NLT include inter-organizational contexts. This result shows that the network context, and especially network leadership, is much broader than often acknowledged.

Figure 2: The multi-dimensional scale of network leadership.
Note: Figure 2 adds to figure 1 based on a detailed Excel-file including a column for the context marked as either inter- or intra-organizational \((n = 148)\). The relative division calculated in percentages per construct resulted in figure 2.

Concluding and coming back to sub-question one, nine different network leadership constructs have been developed in the literature. These constructs comprise: shared leadership; distributed leadership; complexity leadership; collaborative leadership; collective leadership; democratic leadership; participative leadership; intergroup leadership; and NLT. Besides, differences were found between the nature of the constructs. The extent to which a focal leader is present in the network and the inter- or intra-organizational nature of network
leadership were found two important contingencies on which to differentiate between the various constructs.

**Antecedents and outcomes of network leadership**

Networks in organizational settings often emerge with specific ambitions or goals in mind, independently from whether it concerns small networks, large inter-organizational or even inter-cultural networks. With leadership being one of the components influencing network effectiveness in the network context (Hwang and Moon, 2009), the emergence of this network leadership is a critical factor to consider. The various constructs differ in terms of several indicators that might influence the establishment and results from the network. In order to establish network configurations that fit well with the context and aims of the network, interesting avenues of research are the antecedents and outcomes of the different constructs. Several questions arise in this respect: When an organization has specified its outcomes, which of the constructs fits best? Or: Are different antecedents predictors of the different constructs? Answers to these type of questions not only brings the field its much needed clarity, but also helps practitioners in shaping their networks optimally. So as to address sub-question two, the paragraphs below consecutively discuss the antecedents and outcomes for each of the constructs as found in the literature.

**Antecedents of network leadership**

This section examines the differences between the constructs on the basis of their predictors. Table 3 displays an overview of the scope of antecedents as discussed in the literature of the various constructs. When analyzing these antecedents, several leveled categories were formulated stemming from the inductive analysis as outlined in the methodological section of this research. Abilities, personal attributes and affect all describe individuals and are with that categorized as “individual characteristics”. Relational attributes/behavior, group cohesion, communication and shared goals focus on relational aspects and therefore together categorized as “relational characteristics”. The codes “managerial actions” and “network
characteristics” were maintained as separate categories as no fit could be established with the other categories. On top of this four-fold division, a dichotomous division was established. Both individual characteristics and managerial actions revolve around individuals and thus were grouped as “individual-oriented”. The relational characteristics and network characteristics on the other hand focus on the relational nature and are therefore categorized as “group-oriented”. An overview of the categories is added to Appendix 1. A discussion of the antecedents and its distribution over the different categories is found below.
Table 3: Antecedents of network leadership per construct in individual- and group-oriented categories

Note: The size of the check marks shows the relative importance within the construct, besides an extended overview of table 3 is added to Appendix 3

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<thead>
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Note: The size of the check marks shows the relative importance within the construct, besides an extended overview of table 3 is added to Appendix 3.
First, it stands out that individual characteristics are hardly considered within intergroup leadership and NLT. As NLT and mainly intergroup leadership heavily recognize the presence of a focal leader, this lack of discussion of individual characteristics was found counter-intuitive. Also democratic and participative leadership devote scarce attention to individual characteristics, though it should be noted that these two constructs are overall less thoroughly assessed. On the other hand, several constructs that consider sharing of the leadership equation to a higher extent – namely shared, distributed and collaborative leadership – plentifully examine the individual characteristics that are indicated as antecedents of these forms of network leadership. In this, a focus is mainly on the abilities and personal attributes needed such as adaptability (Burke et al., 2013), team member integrity (Hoch, 2013) and charisma (Spillane et al., 2001). More generally, the individually oriented characteristics that are mentioned are mostly of an ability-oriented nature. All in all, it thus appears that – except from participative leadership – all constructs to some extent acknowledge the importance of capable actors within the network, while the other individual characteristics pertain mostly to the more distributed or shared constructs.

While those individual characteristics are hardly discussed within intergroup leadership and NLT, managerial actions are abundantly considered. In fact, both extremes of the spectrum discuss the managerial actions that are needed to establish a certain type of network leadership. Examples are encouraging contact (Pittinsky and Simon, 2003), managing the collaborative process (Ryan, 2001), and trust building (Chen, 2008). This in contrast to the middle four constructs – consisting of collaborative, collective, democratic and participative leadership – which entirely lack the inclusion of managerial actions as predictors of the genesis of these particular forms. The presence of this type of antecedents in the high end of the widely dispersed leadership side of the spectrum, while lacking in the middle, is remarkable. Whereas the distributed leadership literature includes a focal leader in around
half of the cases, both complexity and especially shared leadership often reject the existence of a single designated leader. This suggests that multiple and formally unspecified actors in a widely dispersed type of network leadership to at least a certain extent actively take up the leadership role and the classical associated interventions. This conjunction is particularly discussed within the “followership field”, with among others, Uhl-Bien et al. (2014), Epitropaki et al. (2013) and Shamir and Howell (2000) discussing the exhibition of behaviors and traits by multiple actors that were previously only assigned to designated leaders. However, the managerial actions can also result from an external leader. Carson et al. (2007) highlight the importance of the presence of an external leader in a shared leadership network in order to enable a team to develop self-guidance, which is similar to a NAO governing a network (Provan and Kenis, 2008). On the other hand, analysis of managerial actions executed within an intergroup or NLT network is more intuitive, with both types nearly always containing a designated leader. Those managerial actions are merely group focused and include, among others, exploiting opportunities (O’Toole and Meier, 1999).

Relational characteristics are also to some extent discussed by all constructs, though they do not represent the main focus of antecedents referred to. Complexity leadership represents an exception to the mere dispersed constructs by relatively drawing more attention to the relational characteristics such as being bound by a common goal (Yammarino et al., 2012; Uhl-Bien et al., 2012). Shared leadership also to a higher extent examines relational characteristics besides its slight focus on the individual characteristics. However, it should be noted that shared leadership is in general to a greater extent examined, which might have influenced the occurrence of antecedents. Also constructs more often including a focal leader relatively regularly discuss relational characteristics, with thereby primarily focusing on antecedents around group cohesion. This underlines the relational nature of leadership (Carter et al., 2015). Though when taking this together with the fact that relational characteristics are
not the focus of antecedents referred to, it may be hypothesized that relational characteristics represent a fundamental construct needed to establish fruitful network leadership.

Lastly and noteworthy, all constructs include at least one network factor as antecedent of the specific form of network leadership. Complexity leadership is in this most pronounced, which fits the field’s acknowledgment that the modern organizational contexts’ complexity is often so high that leadership cannot be carried out by one single person. However, none of the constructs has network characteristics as the most important antecedent. The inclusion of network characteristics in all constructs underlines the importance of context in leadership and that leadership is situated in its specific context (Carter et al., 2015).

Figure 3: Division of the antecedents of network leadership per construct on the basis of individual- or group-oriented. Figure 3 adds to figure 1 based on a detailed Excel-file including a column for the discussion of antecedents marked as either individual- or group-oriented per study. The relative division calculated in percentages per construct resulted in the interval scale presented in the figure.
The dichotomous division into individual- and group-oriented is added to the initial continuum, of which an overview is found in figure 3. As can be concluded from the figure, most constructs are individually-oriented in nature when taking their antecedents into account. However, it should be noted that this is for both intergroup leadership and NLT a result of the managerial actions found in the literature, while it for the other constructs results from the individual characteristics discussed.

Besides the analysis per category, several things stand out on the construct level. First of all, it appears that not every construct is assessed as thoroughly as others. For example, shared leadership is widely examined, while democratic leadership – despite its longer existence – is only sporadically assessed. Moreover, some categories include more antecedents and (quantitative) examination. Also, whereas both intergroup leadership and NLT discuss many managerial actions that are often group focused, differences appear when a distinction is made on the basis of Yukl’s (2012) taxonomy consisting of relation-, task-, change- and externally-oriented. Intergroup leadership mainly includes relation-oriented actions such as activating a shared identity (Hogg et al., 2012) and encouraging contact (Pittinsky and Simon, 2003). Contradictory, NLT is mostly focused on task- and externally-oriented actions, including creating system stability (O’Toole and Meier, 1999), redeploying or patching resources (Shortell et al., 2002), and championing network agendas (Long et al., 2013). Proceeding with these managerial actions together with the lack of discussion of individual characteristics for these two constructs that focus most on the focal leader, it might be hypothesized that in the specific network context and/or intergroup context it is less important who the leader is, and more important which leader activities are used to build and maintain its (inter-organizational) network effectively. Lastly, and as previously mentioned, collective leadership represents a high amount of ambiguity within the construct. This is
stressed by the antecedents, which show a fairly proportional division of the antecedents over the different categories.

**Outcomes of network leadership**

While table 3 presented the antecedents of the various constructs, table 4 provides an overview of their outcomes as published thus far. Again, inductive analysis led to several categories. The codes team performance, organizational performance and leader performance were all discussing performance related outcomes and therefore categorized as such. Learning, innovation and change were found to be all revolving around the ability to be adaptive, and with that grouped as “adaptability”. “Perceived efficacy” is another established category including empowerment, satisfaction and motivation resulting from the personal well-being of participants and eager to be involved. Lastly and again, group cohesion and shared goals, together with commitment, are categorized as “relational” outcomes. A dichotomous higher order categorization resulted from a division into more hard or soft outcomes. Both performance and adaptability discussed more hard “performance outcomes”, with on the other hand perceived efficacy and relational outcomes being more soft outcomes related to “interaction”. An overview of the categories is added to Appendix 2. A discussion of the antecedents and its distribution over the different categories is found below.
Table 4: Outcomes of network leadership per construct in performance- and interaction-oriented categories

Note: The size of the check marks shows the relative importance within the construct, besides an extended overview of table 4 is added to Appendix 4

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<thead>
<tr>
<th>Performance-oriented</th>
<th>Interaction-oriented</th>
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<tbody>
<tr>
<td></td>
<td>Team/leader</td>
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<td>Shared leadership</td>
<td>✓</td>
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<tr>
<td>Complexity leadership</td>
<td>✓</td>
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<tr>
<td>Distributed leadership</td>
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<td>Collaborative leadership</td>
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<td>Collective leadership</td>
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<td>Participative leadership</td>
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<td>Intergroup leadership</td>
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<td>NLT</td>
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</table>
First, performance related outcomes are abundantly present in the literature. Apart from the above discussed complexity and democratic leadership, all constructs include more or less outcomes in one of the three performance related categories. The division across team/group or the broader organizational related performance outcomes can be considered proportional in general, though the distribution across the different constructs shows the focus of some of the constructs. For example, shared leadership is more focused on team or group performance and effectiveness outcomes such as team performance (Carson et al., 2007), and team effectiveness (Wang et al., 2014; Pearce and Sims, 2002). An exception to this is Ensley et al.,’s (2006) new venture performance. Though, as new ventures are often represented by (founding) teams, the definition of ‘venture’ might be considered in a nuanced manner. On the other hand, distributed leadership’s focus is on the broader organization with outcomes including organizational development (Harris et al., 2007), organizational performance (Meier and O’Toole, 2001), and employee performance (Lam et al., 2015). The above fits the literature’s bases well in that shared leadership is considered as a team based property (Chiu et al., 2016; Li et al., 2008; Carson et al., 2007; Ensley et al., 2006), with distributed leadership being less narrowly focused and including the wider organization (Heck and Hallinger, 2010; Gronn, 2002). Furthermore, it stands out that the effectiveness of the leader is merely analyzed in all constructs. This might suggest that, even in networks with focal leaders, not the leader’s effectiveness but the network goals and effectiveness are aimed at.

Second, the category adaptability shows larger differences between the different constructs as distributed over the spectrum. Whereas the five constructs counted from the right hand side of the spectrum – shared leadership, complexity leadership, distributed leadership, collaborative leadership, and collective leadership - include both learning and change oriented outcomes, those are completely lacking for the other four constructs. The dynamic interactions within the mere dispersed network leadership constructs (Klein et al.,
2006) may give rise to this learning element. Besides, the roles and relationships within those networks are rather fluid in order to suit the specific task at hand (DeRue and Ashford, 2011; Li et al., 2008), which may lead to more adaptive networks. Innovation outcomes are in contrast less established and occur only on both ends of the spectrum.

The two constructs that are highly valuing democratic principles – participative leadership and democratic leadership – together with the widely dispersed shared leadership refer to perceived efficacy. Outcomes such as empowerment (George et al., 2012; Yammarino et al., 2012; Huang et al., 2010), job satisfaction (Drescher and Garbers, 2016; Yammarino et al., 2012; Harris and Ogbonna 2002)) and team proactive behavior (Erkutlu, 2012) are discussed. This focus within the three constructs may result from the fact that they share the aim is to sincerely strive for active cooperation in the network (Lam et al., 2015; Huang, 2012). The category is contradictory hardly discussed by the other constructs, which is surprising given the fact that most constructs to at least some extent recognize sharing of the leadership role.

Lastly, all constructs except from complexity leadership and intergroup leadership include at least some relational outcomes of network leadership. In this, group cohesion is most often noted. Again, this result stresses the relational nature of leadership (Carter et al., 2015). Outcomes related to group cohesion such as affective climate (Yammarino et al., 2012) and loyalty (Yammarino et al., 2012) are especially present in collective leadership. Whereas other outcomes are also discussed in the as previously noted ambiguous field, this focus might suggest that building a coherent relationship is the aim of collective leadership. On the other hand, establishing shared goals by network leadership is only occasionally stressed.
Figure 4: Division of the outcomes of network leadership per construct on the basis of performance- or interaction-oriented. Figure 4 adds to previous figure 1 based on a detailed Excel-file including a column for the discussion of outcomes marked as either performance- or interaction-oriented per study. The relative division calculated in percentages per construct resulted in the interval scale presented in the figure.

The dichotomous division into performance- and interaction-oriented is added to the initial continuum, of which an overview is found in figure 4. Whereas half of the constructs are to a higher or lower degree performance focused, the other half is mainly interaction focused. Contradictory to the table containing antecedents, the outcomes of network leadership across its various forms is more evenly spread.

Moreover, several things stand out on the construct level. Shared leadership is again studied most thoroughly with research been conducted in all four of the above outlined categories. Though, other constructs are grouped in a more focused pattern or are – like intergroup leadership – hardly studied. Complexity leadership for example is only represented...
in the category adaptability. While this focus fits complexity leadership’s notion that organizations need to adapt to the current complex environment in order to be effective (Uhl-Bien and Marion, 2009), the complete absence of other types of outcomes is remarkable concluding from the construct’s relational nature (Lichtenstein et al., 2006) and goal centered design (Hill, 2009; Lichtenstein et al., 2006; Uhl-Bien et al., 2007). Another heavily focused construct is NLT, which scientific base is almost completely concentrated at performance-oriented outcomes such as organizational performance (Meier and O’Toole, 2002), network outcomes (Leithwood and Azah, 2016), and leader effectiveness (Balkundi and Kilduff, 2006). Therefore, it might be concluded that in specific network contexts including a focal leader, performance driven goals are aimed at instead of developing a well-established relationship. This might also be in line with Levine and White’s (1961) conjunction that networks lead to the accomplishment of goals that could not otherwise be attained due to scarcity of resources within a single entity. Democratic leadership almost completely concentrates on the category perceived efficacy. This focus is explained by the fundamental democratic values of the construct (Gastil, 1994; Fishkin, 1991; Dahl, 1989). Remarkable, no single performance-oriented outcome is discussed in the democratic leadership literature.
Discussion

Proposing a definition of network leadership and the 4-C model

The above literature review provided a first explicit in-depth analysis of the various network leadership constructs. It was revealed that some forms of network leadership exhibit a better fit with certain contexts or specific desired outcome.

Besides this more focused level that includes all constructs separately and distinguishes multiple categories, a mere meta-level view can be adopted. In this respect, network leadership is by this study defined as *leadership executed in a network setting by one or more network actors or externals in which the precise leadership role and its distribution is heavily dependent upon the context (the situation at hand and the desired network outcomes).*

On this higher level, a two-fold division within the antecedents has been established on the basis of individual-and group-oriented antecedents. On the other hand, the outcomes have been divided into performance- and interaction-oriented. This division into group and individual for the antecedents and interaction and performance for the outcomes can be adopted to examine the applicability of leadership styles in certain contexts. Note that relational characteristics are both an antecedent as well as an outcome of network leadership, which might evoke self-reinforcing effects. Combining the two twofold divisions, a matrix with four quadrants was formed that includes four archetypes of leadership styles that fit well in the specific situations that result from the combination of present antecedents and desired outcomes. The four network leadership styles stemming from the specific combination of antecedents and outcomes are outlined in figure 5. Below, the four styles are discussed successively.
Figure 5: Four types of leading a network – The 4-C model

The coach
Quadrant I represents the group-interaction situation in which the network is set up with the aim of establishing a compelling interaction within the network while the actors already represent a strong group. The inclusion of actors possessing high levels of perceived efficacy and grounded relationships are focal points the network must accomplish. On the other hand, factors as group cohesion or the existence of shared goals are high, and thus the fundamentals of actors being able and willing to interact are already existent. Therefore, the group forming the network is well on track to accomplish its goals, which leads to a more modestly present or absent focal leader role in this process. Instead of choosing or appointing a heroic designated leader, mere shared and dynamic types of leadership fit the situation at hand. Actors are attuned to each other and the positive group dynamics might enable constructive alternating granting and claiming behaviors (DeRue and Ashford, 2010) matching the current
floorer. The high levels of perceived efficacy lead to actors being able to get the best out of themselves and the network in a dynamic manner without the interference of a heroic leader.

However, the presence of an influential person positioned more external might be advisable in certain situations. An example is the situation when the goals of the network are interesting and value-adding, though do not represent the primary goals of the included actors within their own organization. This is particularly interesting if being connected is the goal since the network goals are often a secondary aim for the individual actors, while still being the primary goal of the network. A small – external – leadership role adding to the internal high density network might therefore be needed to steer the process when needed and keep the network on track to reach the set goals. Carson et al., (2007) even conjectured the necessity of an external focal leader in order to let mostly shared networks be effective. Such a leader does not represent a heroic visionary influencer, but merely a facilitating coach that regularly tests whether the network is on track and aids the network by keeping them goal focused and connected when needed. Substantive content knowledge is thereby less important, while social skills are highly relevant.

When assessing the extant constructs, the shared forms of network leadership fit quadrant I best. Both shared leadership and complexity leadership embrace high levels of sharing from the leadership equation; dynamic leadership including granting and claiming behavior and the existence of an external ‘leader’ that connects and energizes if needed.

The consultant
The group-performance situation, whereby a well-established group representing the network aims at achieving performance-related goals such as effectiveness and innovation, is illustrated by quadrant II. Group cohesion is high and shared goals are already present within the participant group, with therefore no direct leader intervention needed in this social process. However, in order to reach the performance related goals of the network, a visionary
leader that provides direction to the coherent group can be expected to increase the outcomes of the network. Such a leader is less committed to managing the social glue, and more to steering and providing definitive interventions that lead to outcomes such as effectiveness, innovation and learning. In this way, the well-established network is able to flourish and make progression from a connected group of actors to a network that produces effective outcomes. Though, social skills and personality traits like charisma might still be very important as the leader must be able to motivate and boost the enthusiasm of the group. This leader has to stimulate the forming of a clear, shared ambition, actively motivate the network and provide the conditions that the network needs to reach these ambitions. In order to be able to establish this ambition and lead the network towards it, the leader also has to have a certain level of content knowledge or should be able to easily tap it from the network members.

Concluding, we assume that both intergroup leadership and NLT are leadership styles needed in quadrant II. Those types of network leadership include a designated leader that steers the group with the use of managerial interventions, such as championing agendas, towards performance related outcomes.

The connector
The combination of individual-interaction is present in quadrant III. Good interaction is the primary goal of the networks within this quadrant, leading to well-established relationships between the actors that feel proactively engaged and empowered. On the other hand, the actors forming the network represent merely individuals whose personal traits are classified as highly productive with the social glue within the network seeming to be missing. Achieving the goal of the network, world-class interaction, is therefore relatively difficult to accomplish as all the highly capable ‘cells’ within the network have to become a smooth entity. Increasing the group cohesion in its widest sense is therefore needed: not only the existence of a strong group backed by settled relationships but also the presence of strong shared goals and
ambitions. While the individuals are highly capable content-wise, creating this higher order collective might be hard precisely because a common base is largely missing. The actors’ levels of abilities and skills might however have a positive influence on the levels of perceived efficacy that are aimed for. Besides, practice emphasized the importance of motivation among the actors in order to let the network flourish and create interaction. All in all, a focal and designated leader is needed that embraces and instills true participation of the individual actors. Important in this is the ability of the leader to convince the actors of the importance of working together. Therefore, factors such as increasing motivation, satisfaction and empowering are essential. On the other hand, content knowledge is barely needed from the leader as the highly capable actors within the network are able to fulfill this role themselves.

The focus on interaction outcomes together with the existence of capable actors who need to become a coherent network fit democratic and participative leadership well. Those constructs include designated leaders that not particularly aim at sharing of the leadership equation, but true participation and the connection of actors in the network.

**The catalyst**
The last quadrant representing the combination of *individual-performance*, quadrant IV, aims at accomplishing performance-related goals such as effectiveness and innovation with the actors in the network being highly capable in terms of their skills and abilities. The network is therefore well-fit to reach the goals as the actors are able to accomplish high performance standards. However, networks consist of a bigger entity than the actors on their own and therefore the actions of the individual actors need to be tied together; thereby increasing the density and collaboration in the network. Whereas the levels of sharing and working together are to be increased, interaction is in quadrant IV of minor importance compared to quadrant III. The assembling of the actors is merely a means to reaching the performance related goals
and thus serves a functional purpose. In this situation, (leadership) tasks may be best divided effectively across the actors, thereby taking advantage of individual and stimulating group competencies (Raelin, 2006; Finch, 1977; Morse, 2008; Herrington, 2000). Total sharing of the leadership equation might however be too pervasive as the levels of group cohesion are currently low. Therefore, distributed forms of network leadership may fit best. Besides, a focal leader may often be needed to streamline the complex processes that networks face in order to reach the network goals. Such a leader steers the group and provides and propagates a cohesive and substantive long-term ambition. High levels of content knowledge are not crucial for this leader as the network itself contains much knowledge. In this, a leader can be capable content-wise itself or he/she should possess the social skills in order to tap the knowledge from the individuals within the network.

From the above, it can be concluded that distributed and collaborative leadership fit the specific context of quadrant IV well. Both often include a focal leader that streamlines the processes of the different actors, which are distributed on the basis of the personal expertise of the network members.

**Theoretical implications**
The above outlined results gave rise to the following theoretical contributions. First, this study adds to the network leadership literature in general by providing a first comprehensive literature review of network leadership. Only scant research includes more than one of the various network leadership constructs, thereby often falsely adopting the terms conversely. Carter et al. (2015) and Yammarino et al. (2012) opened some avenues for future research by conjecturing the multi-faceted nature of network leadership; though still being focused on specific sub-areas (e.g., social networks) and heavily exploratory in nature. In contrast to prior research, this study provided thorough examination of the various constructs and highlighted their individual characteristics.
Second and concluding from the above quoted analysis, this study pointed to the importance of recognizing the differences between the various constructs. With that, a multi-dimensional scale with two axes was established on which the (subtle) differences are accorded their full weight. Most important, and contradictory to prior research, the various forms of network leadership were found to be positioned on different places on a scale reaching from leadership being widely dispersed to leadership being present in a focal leader. Besides, another important distinction was found to be the inter- or intra-organizational context adopted, and with that added to the literature lacking information on this point. These results build on the work of Carter et al. (2015) that included a dichotomous distribution within the field, however provided a more nuanced and accurate view of the abundant literature as the above results highlighted.

Third, this study aided in providing structure and clarification within the field as consequence of the literature review; the concluding categorizations, tables and figures; the network leadership model; and the broad-based definition of network leadership.

Fourth, the discussion of both the antecedents and outcomes of network leadership filled a research gap and answered calls from the field (Yammarino et al., 2012) by determining how the various constructs are scientifically linked to the factors shaping the network leadership role as well as the outcomes eventually resulting from it.

Fifth and lastly, the results from the literature review pointed to the lack of a more meta-level model of network leadership that included clear-cut roles to be adopted in specific contexts. As context was found to be a crucial factor in network leadership (Carter et al., 2015), the model incorporated in this study filled an urgent research gap. With the 4-C model, rise has been given to new avenues of research on network leadership that enables effective interpretation of the leadership equation in the presence of distinct conditions; thereby answering calls of Yammarino et al. (2012).
Practical implications
During the process of writing this paper, the researchers conducted several conversations with network practitioners in order to add a dimension that provides a practical view. Appendix 5 provides a short overview of the methodology adopted and practitioners spoken. All in all, three general conclusions came forward, which are shortly discussed below. First, the context in which the network is present highly influences the type of leadership that is found applicable. For example, the amount of power felt by both the leaders and assigned to by the other network actors appeared to be dependent upon – among others – the facts whether the network was mandatory or voluntarily constructed; whether the network activities represented primary or secondary activities for the organizations in the network on their own; and whether the leader was a formal leader or granted leader. Second, it came into view that the perceptions on leadership within a single network greatly differ due to the personal visions of the practitioners. This underlines the importance of context in network leadership (Carter et al., 2015). Third, the conversations made clear that many things are implicitly present within networks – both the current way of working as well as the factors that led to a certain configuration – and that networks always keep evolving.

In relation to the above, the model has particularly been found applicable to start the conversation with practitioners on the subject. The discussion of the model with the practitioners led to awareness about the network leadership role adopted that the practitioners marked as “gained via the model”. Therefore, the model provides practical tools that aid practitioners in framing their thoughts and with that gaining deeper understanding of the network and especially the network leadership role at hand. When such a deeper knowledge is gained and the network actors with that better understand the hows and whys of their particular network, the model can also be applied to assess whether the current network leadership configuration is found effective or needs to be adapted. Then again, the model can aid in providing insights about the necessities for a specific goal.
Strengths and limitations
The biggest strength of this research is the fact that an explicit and thorough grounded literature review method (Wolfswinkel et al., 2013) was adopted aimed to ensure the inclusion of only relevant literature and constructs. Besides, this study provided the first comprehensive review of the various network leadership forms and with that filled several research gaps and answered research calls. Moreover, and to the best of our knowledge, this study provides the first model on which type of leading a network fits in specific contexts.

However, the adopted methodology in this research may have been subject to some limitations. First, the choice of only general databases for the first search round may have led to the overlook of some publications. However, the subsequent snowball sampling and hand-searched procedures partly offset this risk. In relation to this, there will always remain a small chance that a construct is not included in this research.

Second, whereas the 4-C model has been built on the basis of a comprehensive literature review, it should be noted that the model has not been tested in this research. The method of inductive analysis aims, as noted in the methodology section, at theory building rather than theory testing. Validation and perhaps further elaboration of the model is therefore needed by future research.

Moreover, the conversations with practitioners and the resulting lessons learned should not be seen as an attempt to test the model, but to offer practical insights in the applicability and practitioners’ need for the model. The small number of participants that were conducted as well as the fact that they were gathered only via Dutch networks, may be regarded as a limitation. However, given the specific purpose of these participants, we feel that this limitation is indeed limited.

Future research directions
As discussed above, the network leadership field is still evolving heavily and with that including ambiguities that need clarification and severe research gaps that need to be filled. A
large share of the network leadership research only assesses a small number of the lower level so-called constructs conceptually and forgoes the meta-level analysis of whole networks. The current general dynamic constitution of the workplace however highlights the urge to gain knowledge resulting from the increase in complex matters that are hard to be solved by single persons, not to mention single organizations; and the changes in organizational structure and leadership that are required to serve organizational outcomes in a highly effective manner (e.g. Lord, 2008). Increasingly, the context asks for broader based networks and leadership that transcends the level of single formal persons (Podolny and Page, 1998).

The contradiction between the necessity to understand network leadership thoroughly and the lack of meta-level and empirical knowledge of the field highlights the urge to gain a deeper understanding of network leadership. These insights together with high-end techniques to explore wider level network contexts provide serious opportunities to the understanding and effectiveness of network leadership. Based on the limitations and results from this study, several areas of future research are stated below.

First, further research on the 4-C model is needed to gain a deeper understanding of which network leadership design applies to the context at hand in order to reach effective network outcomes. Empirical and most favorable longitudinal multi-level research is desired in this respect. In this, mixed-methods analyses such as more quantitative density assessments and qualitative interviews can be combined in order to establish a solid base of theory within the field. Moreover and in relation to the latter, many different participants and settings are to be included. The precise roles and tasks per quadrant are to be further elaborated on, tested and assessed whether they and their outcomes (effectiveness) are dependent on certain factors. For example, a highly interesting path of future research could address whether the leadership roles are congruently and/or fluently present over time (i.e., when the network is developing). As in the leadership field in general - and as seen particularly in the network
leadership field – little is known about the specific behaviors that fit the leadership roles executed, the actual behavioral repertoires that come along with network leadership are to be considered as a novel line of research. The video-observation method, preferably including video-shadowing at other (less formal) work settings (Vie, 2010; Czarniawska, 2007), would be particularly interesting in this case (Van Dun et al., 2017).

Also and as found above, a research gap exists in both intergroup leadership and NLT as both hardly discuss the individual characteristics of this leader. This might lead to the proposition that what the leader does is more important than who the leader is. However, this proposition needs to be examined and when found incorrect, urgent research is needed on the ‘who’ of the leader in (inter-organizational) networks. In addition, public sector research often includes an external governor in the form of a so-called NAO. Propositions within the network leadership field have been made that – in heavily shared contexts – an external leader ensures effectiveness (Carson et al., 2007). However, to the best of our knowledge, no substance is given to this person, leading to such research calls by this research.

On the lower level, further examination is recommended on the outcomes of network leadership in its particular forms. Generally, relatively scarce (empirical) knowledge has been gained on the outcomes of network leadership extending the level of performance. Therefore, a more thorough understanding of the already linked factors (i.e., meta-analysis) together with examinations of other outcomes such as group cohesion, innovation or learning are proposed.

Not only outcomes are interesting in this respect, but also the antecedents linked to network leadership. As discussed above, the extent of sharing from the leadership equation appears to coincide with the existence of specific types of antecedents. Especially empirical and longitudinal research could lead to breakthroughs in the knowledge about the genesis and development of network leadership in its specific contexts. When certain outcomes are linked to specific network leadership types, a logical step would be the strengthening and where
possible ensuring of certain predictors. This would lead to a better understanding of and the trails taken, but also opens doors for practitioners in the field of self-influence.

Lastly, and especially empirically, more scientific attentions would to be devoted to the inter-organizational context as the current context often asks for networks and thus network leadership that transcend the level of single organizations.

**Conclusion**

This study added to the network leadership literature in several ways. Firstly, it provided a first comprehensive literature review of network leadership. With this, a better understanding of network leadership and its many facets was gained. Secondly, a multi-dimensional scale of assessing network leadership in its various forms was proposed. The results showed that differences are present between the various constructs and that they can be positioned from ‘a focal leader being present’ to ‘widely dispersed leadership’, with most of the research revolving around the focal leader side of the spectrum. More generally, however, the following four pairs could be deducted on the basis of their characteristics: 1) shared leadership and complexity leadership; 2) distributed leadership and collaborative leadership; 3) participative leadership and democratic leadership; 4) intergroup leadership and NLT. The other important distinction pertained to a division on the basis of the variously discerned intra- or inter-organizational contexts. Third, the above, together with the model and the developed definition of network leadership, offered structure and clarification within the developing and sometimes ambiguous field. Fourth, the discussion of the antecedents and outcomes of network leadership answered calls from the field. Lastly, this study provided guidance in which type of network leadership fits certain contexts with use of the developed 4-C model. All in all, nine different network leadership constructs were found in the literature. These constructs comprise: shared leadership; distributed leadership; complexity leadership; collaborative leadership; collective leadership; democratic leadership;
participative leadership; intergroup leadership; and NLT. Among others, differences in
context, nature and level exist between the constructs. The extent to which a focal leader is
present together with the inter- or intra-organizational context adopted appeared to be two
important contingencies on which to differentiate between the various constructs. Besides, the
4-C model provided answers to which types of network leadership exhibit a good fit with
specific contexts.

Finally, this study pointed to the importance of gaining in-depth knowledge on
network leadership. Large-scale longitudinal multi-level field studies, preferably adopting
mixed-methods designs including a broad range of participants and settings, are
recommended. In this way, the network leadership field can be developed with strong theory,
and also the measuring of effectiveness in network settings is to be advanced. As several
studies have shown that leader effectiveness is a crucial component in striving for (maximum)
organizational effectiveness (e.g. Agho, 2009; Baker, 2007), such knowledge is of enormous
future relevance.

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gave rise to a new dimension in my knowledge of network leadership. Lastly, thanks to my loving family and friends, who always supported me during the process of writing this thesis.

References


### Appendix 1: Coding scheme antecedents

<table>
<thead>
<tr>
<th>Category</th>
<th>Codes</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INDIVIDUAL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual</td>
<td>Ability</td>
<td>The capability of a person to perform his/her job, residing from one’s</td>
<td>“Adaptability”</td>
</tr>
<tr>
<td>characteristics</td>
<td></td>
<td>skills, knowledge and competencies.</td>
<td>“Managerial skills”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Knowledge”</td>
</tr>
<tr>
<td>Personal attributes</td>
<td></td>
<td>Characteristics that define one’s personality, such as traits and</td>
<td>“Constructive interaction style”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>thinking styles (Atwater and Yammarino, 1993; Wood, 1989).</td>
<td>“Facilitative leadership”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Sex”</td>
</tr>
<tr>
<td>Affect – positive</td>
<td></td>
<td>Positive affect is the extent to which a person feels enthusiastic,</td>
<td>“Optimism”</td>
</tr>
<tr>
<td>and negative</td>
<td></td>
<td>active and alert; negative is a general dimension of subjective</td>
<td>“Managerial resistance”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>distress and pleasurable engagement (Watson, Clark and Tellegen, 1988).</td>
<td>“Motivation”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managerial</td>
<td></td>
<td>The interventions of actors in the network that are historically</td>
<td>“External coaching”</td>
</tr>
<tr>
<td>actions</td>
<td></td>
<td>attributed to managers (based on Carstens et al., 2010).</td>
<td>“Activate a shared identity”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Discipline and sector boundaries”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GROUP</strong></td>
<td>Relational</td>
<td>A settled way of thinking or feeling about something the way in which</td>
<td>“Empowering”</td>
</tr>
<tr>
<td>characteristics</td>
<td>attitudes/behavior</td>
<td>an actor operates in response to a particular situation or stimulus.</td>
<td>“Granting and claiming behavior”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Allophilia”</td>
</tr>
<tr>
<td>Group cohesion</td>
<td></td>
<td>A dynamic process reflected in the tendency of a group to stick</td>
<td>“Social support”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>together and remain united in the pursuit of its goals and objectives.</td>
<td>“Interdependence”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Carron, 1982).</td>
<td>“Trust”</td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td>The imparting or exchange of information by speaking, writing, or using</td>
<td>“Open communication”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>some other medium.</td>
<td>“Effective communication”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Resource sharing”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Shared vision”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Cooperative goals”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Being bound by a common goal”</td>
</tr>
<tr>
<td>Shared goals</td>
<td></td>
<td>The existence of mutual objectives and aspirations.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network</td>
<td></td>
<td>The attributes that define and surround a certain network.</td>
<td>“Being a face to face team”</td>
</tr>
<tr>
<td>characteristics</td>
<td></td>
<td></td>
<td>“Organizational characteristics”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Availability of information and resources”</td>
</tr>
</tbody>
</table>
### Appendix 2: Coding scheme outcomes

<table>
<thead>
<tr>
<th>Category</th>
<th>Codes</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PERFORMANCE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance</td>
<td>Team/group</td>
<td>The degree to which a team or group accomplishes its goal or mission (Devine and Phillips, 2001).</td>
<td>“Team performance” “Team effectiveness” “Group goal attainment”</td>
</tr>
<tr>
<td></td>
<td>performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Organizational</td>
<td>The organization’s output as measured against the goals or objectives (Richard et al., 2009; Dess and Davis, 1984).</td>
<td>“New venture performance” “Organizational performance”</td>
</tr>
<tr>
<td></td>
<td>performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Leader performance</td>
<td>The degree to which the leader contributes to the network/ the degree to which a leader accomplishes the goals/mission set.</td>
<td>“Leadership effectiveness” “Leader effectiveness”</td>
</tr>
<tr>
<td><strong>Adaptability</strong></td>
<td>Learning</td>
<td>Learning is a relatively permanent change in behavior brought about by practice or experience (Nills and Simms, 1981).</td>
<td>“Team learning” “Organizational learning” “Increased expertise”</td>
</tr>
<tr>
<td></td>
<td>Innovation</td>
<td>Innovation is the generation, acceptance, and implementation of new ideas, processes, products or services (Thompson, 1965).</td>
<td>“Innovative behavior” “Network innovation” “Creativity” “Swift coordination” “Change” “Organizational adaptability”</td>
</tr>
<tr>
<td></td>
<td>Change</td>
<td>The act or process through which something becomes different.</td>
<td></td>
</tr>
<tr>
<td><strong>INTERACTION</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived efficacy</td>
<td>Empowerment</td>
<td>The intrinsic motivation manifested in four cognitions (meaning, competence, impact and self-determination) reflecting an individual’s orientation to her/his work role (Spreitzer, 1995).</td>
<td>“Team empowerment” “Employees showing leadership behaviors” “Empowerment”</td>
</tr>
<tr>
<td></td>
<td>(Job) satisfaction</td>
<td>The positive emotional state resulting from one’s job or job experiences (Locke, 1976).</td>
<td>“Team member satisfaction” “Job satisfaction” “Satisfaction”</td>
</tr>
<tr>
<td></td>
<td>Motivation</td>
<td>The arousal, direction and persistence of behavior (Fransen, 1994).</td>
<td>“Team members’ intended performance” “Team proactive behavior” “Moale”</td>
</tr>
<tr>
<td>Relational</td>
<td>Commitment</td>
<td>The strength of an individual’s identification with and involvement in a particular organization (Porter et al., 1974).</td>
<td>“Organizational commitment” “Commitment” “Involvement”</td>
</tr>
<tr>
<td></td>
<td>Group cohesion</td>
<td>A dynamic process reflected in the tendency of a group to stick together and remain united in the pursuit of its goals and objectives (Carron, 1982).</td>
<td>“Group trust” “Affective climate” “Loyalty”</td>
</tr>
<tr>
<td></td>
<td>Shared goals</td>
<td>The existence of mutual objectives and aspirations.</td>
<td>“Mental model convergence” “Shared goals” “Collective vision”</td>
</tr>
</tbody>
</table>
### Appendix 3: Extended version of table 3 - antecedents of network leadership

<table>
<thead>
<tr>
<th></th>
<th>Individual-oriented</th>
<th></th>
<th>Group-oriented</th>
<th></th>
<th></th>
<th></th>
<th>Network characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Individual characteristics</td>
<td>Managerial actions</td>
<td>Relational characteristics</td>
<td>Group characteristics</td>
<td>Communication</td>
<td>Shared goals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ability</td>
<td>Personal attributes</td>
<td>Affect</td>
<td>Positive</td>
<td>Negative</td>
<td>Relational attitudes/behavior</td>
<td>Group cohesion</td>
</tr>
<tr>
<td>Shared leadership</td>
<td>1, 2, 3</td>
<td>4, 5, 6, 7, 8, 9, 10, 11</td>
<td>12, 13</td>
<td></td>
<td></td>
<td>14, 15, 16</td>
<td></td>
</tr>
<tr>
<td>Complexity leadership</td>
<td>24</td>
<td></td>
<td>25</td>
<td></td>
<td></td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Distributed leadership</td>
<td>1, 32</td>
<td>33, 34</td>
<td>35</td>
<td></td>
<td></td>
<td>36, 37, 38</td>
<td>39</td>
</tr>
<tr>
<td>Collaborative leadership</td>
<td>42, 43, 44, 45, 46, 47, 48</td>
<td>49, 50, 51, 52, 53</td>
<td>54</td>
<td></td>
<td></td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Collective leadership</td>
<td>58</td>
<td>59, 60</td>
<td></td>
<td>61</td>
<td>62, 63</td>
<td>64</td>
<td>65, 66</td>
</tr>
<tr>
<td>Democratic leadership</td>
<td>58</td>
<td>67</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>41</td>
</tr>
<tr>
<td>Participative leadership</td>
<td></td>
<td>51</td>
<td></td>
<td>68</td>
<td></td>
<td>69</td>
<td>41, 70</td>
</tr>
<tr>
<td>Intergroup leadership</td>
<td>71</td>
<td></td>
<td>72, 73, 74, 75, 76, 77, 78</td>
<td>79, 80, 81</td>
<td>82, 83</td>
<td>84, 85</td>
<td></td>
</tr>
<tr>
<td>NLT</td>
<td>86</td>
<td></td>
<td>87, 88, 89, 90, 91, 92</td>
<td></td>
<td>96</td>
<td>97</td>
<td>98</td>
</tr>
</tbody>
</table>
List of antecedents as discussed in the literature:
1: Adaptability team members: Burke et al., 2003
2: Make-up of the group (based on abilities of the group members): Yammarino et al., 2012
3: Specific goal focused abilities: Ensley et al., 2006
4: Motivation: George et al., 2002
5: Self-efficacy: George et al., 2002
6: Constructive interaction style: Balthazard et al., 2004
7: Defensive interaction style: Balthazard et al., 2004
8: Vertical transformational leadership style: Hoch, 2013
9: Leader humility: Chiu et al., 2016
10: Team member integrity: Hoch, 2013
11: Empowering leadership style: Hoch, 2013
12: Training: Pearce, 2004
13: External coaching: Carson et al., 2007
14: Granting and claiming behavior: DeRue and Ashford, 2010; Yammarino et al., 2012
15: Voice: Carson et al., 2007; Serban and Roberts, 2016
16: Empowering team behaviors: Wood, 2005
17: The presence of social support: Carson et al., 2007; Serban and Roberts, 2016
18: Trust: Li et al., 2008; Pearce, 2004; Louis et al., 2009
19: Cohesion: Balthazard et al., 2004
20: Open communication: Li et al., 2008
21: Shared vision: Carson et al., 2007; Li et al., 2008
22: Being a face-to-face team instead of a virtual team; Balthazard et al., 2004
24: Leader skills and knowledge: Clarke, 2013
25: Sensemaking: Louis et al., 2009
26: Relationships between people: Houchin and MacLean, 2005
27: Being bound by a common goal: Uhl-Bien et al., 2002; Yammarino et al., 2012
28: Shared leadership: Clarke, 2013
29: Complex context: Lichtenstein et al., 2006; Uhl-Bien et al., 2002
30: Network conditions: Clarke, 2013
31: Organizational learning: Clarke, 2013
32: Abilities and skills: Spillane et al., 2001
33: Charisma: Spillane et al., 2001
34: Cognition: Spillane et al., 2001
35: Optimism: Harris et al., 2002
36: Leader as steward of the process: Ryan, 2001
37: Managing the collaborative process: Ryan, 2001
38: Maintaining technical credibility: Ryan, 2001
39: Leader influence: James et al., 2007; Thornton, 2010
40: Interdependence: Gronn, 2002
41: Context: James et al., 2007; Currie et al., 2009; Spillane et al, 2001; Huang et al., 2011; Choi, 2007
42: Strategic thinking (as ability): Rubin, 2009
43: (Individual) competencies: Merritt and Kelley, 2017; Morse 2008
44: Group facilitator (as ability): James et al., 2007
45: Promoting broad and active participation (skill): Lasker and Weiss, 2001
46: Ensuring broad based influence and control (skill): Lasker and Weiss, 2001
48: Extend the scope of the process (skill): Lasker and Weiss, 2001
49: Facilitative leadership (style): Vangen and Huxham, 2003
50: Specific leadership types: Friedrich et al., 2009
52: Systems thinker: Alexander et al., 2001
53: Having a sense of mutuality: Morse, 2008
54: Managerial resistance: Archer 1975
55: Empowering stakeholders: Chrislip and Larsson, 1998
56: Organizational characteristics: Merritt and Kelley, 2017
57: Legislative professionalization: Rosenthal, 1998
58: Leader skills and abilities: Friedrich et al., 2009; Kuzcmarski and Kuzcmarski, 1995; Gastill, 1994
59: Supervisor’s perception of the collective navigator role: Margolis and Ziegert, 2016
60: Individual intention: Gauthier-September, 2006
61: Individual attention: Gauthier-September, 2006
62: Culture: Gauthier-September, 2006
63: Maintenance of the group: Friedrich et al., 2009
64: Effective communication: Friedrich et al., 2009
65: Developed network: Friedrich et al., 2009
66: Structure: Gauthier-September, 2006
67: Motivation for democracy: Choi, 2007
68: Well-established relationships: Chen and Tjosvold, 2006
69: Cooperative goals: Chen and Tjosvold, 2006
70: Networks across cultures: Chen and Tjosvold, 2006
71: Leader’s ability (to create an intergroup relational identity): Hogg et al., 2012
72: Encouraging contact: Pittinsky and Simon, 2003
74: Reducing negative intergroup attitudes: Pittinsky and Simon, 2003
75: Creating a third space: Pittinsky et al., 2005
76: Activate a shared identity: Pittinsky et al., 2005
77: Embed groups with a larger whole: Pittinsky et al., 2005
78: Cross cut roles and identity: Pittinsky et al., 2005
80: Allophillia: Pittinsky and Simon, 2007
81: Effective leader influence: Ernst and Yip, 2009
82: Social identity: Hogg et al., 2012; Pittinsky, 2009; Pittinsky and Simon, 2003
83: Honouring tension without trying to eliminate differences: Pittinsky, 2010
84: Availability of information and resources: Lwin and Hirose, 1997; Pittinsky and Simon, 2003
85: Having an external leader: Hogg et al., 2012
86: Certain managerial skills: McGuire and Silvia, 2001
87: Managerial interventions (managing partnership size and diversity; developing multiple approaches to leadership; maintaining focus; managing conflict; recognizing life cycles; redeploying or patching resources): Shortell et al., 2002
88: Creating system stability: O’Toole and Meier, 1999
89: Buffering organization from environmental influences: O’Toole and Meier, 1999
90: Discipline and sector boundaries: Long et al., 2013
91: Exploiting opportunities in the environment: O’Toole and Meier, 1999
92: Champion network agendas: Long et al., 2013
93: Leader as host: Wheatley and Frieze, 2011
94: Trust building: Chen, 2008
95: Shaping mental models of the actors: Morse et al., 2007
96: Leader’s position in the network: Yammarino et al., 2012
97: Resource sharing: Chen, 2008
98: Less complex agency structure: McGuire and Silvia, 2001
## Appendix 4: Extended version of table 4 - outcomes of network leadership

<table>
<thead>
<tr>
<th></th>
<th>Performance-oriented</th>
<th>Interaction-oriented</th>
<th>Relational</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Performance</td>
<td>Adaptability</td>
<td>Perceived efficacy</td>
</tr>
<tr>
<td></td>
<td>Team/group</td>
<td>Organizational</td>
<td>Leader</td>
</tr>
<tr>
<td>Shared leadership</td>
<td>1, 2, 3</td>
<td>4</td>
<td>5, 6</td>
</tr>
<tr>
<td>Complexity leadership</td>
<td></td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Distributed leadership</td>
<td>1, 24</td>
<td>25, 26</td>
<td>27, 28</td>
</tr>
<tr>
<td>Collaborative leadership</td>
<td></td>
<td>33</td>
<td>34</td>
</tr>
<tr>
<td>Collective leadership</td>
<td>1</td>
<td>36</td>
<td>37</td>
</tr>
<tr>
<td>Democratic leadership</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participative leadership</td>
<td>49</td>
<td>50</td>
<td>51</td>
</tr>
<tr>
<td>Intergroup leadership</td>
<td>59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NLT</td>
<td>60</td>
<td>26, 61</td>
<td>62</td>
</tr>
</tbody>
</table>
List of outcomes as discussed in the literature:
1: Team performance: Carson et al., 2007; Nicolaides et al., 2014; Wang et al., 2014; Hoch and Kozlowski, 2014; Mehra et al., 2006; Hiller et al., 2006
2: Team effectiveness: Wang et al., 2014; Pearce and Sims, 2002
3: Group performance: Drescher et al., 2014
4: New venture performance: Ensley et al., 2006
5: Team learning: Liu et al., 2014
6: Individual learning: Liu et al., 2014
7: Innovative behaviour: Hoch, 2013
8: Swift coordination: Klein et al., 2006
9: Team empowerment: Yammarino et al., 2012
10: Employees showing leadership behaviors: George et al., 2012
11: Team member satisfaction: Drescher and Garbers, 2016
12: Team members’ intended performance: Drescher and Garbers, 2016
14: Motivation: Zhu et al., 2012
15: Group trust: Drescher et al., 2014
16: Team cohesion: Mathieu et al., 2015
17: Group cohesion: Ensley et al., 2003
18: Contribution to others: Zhu et al., 2012
19: Collective vision: Ensley et al., 2003
20: Organizational learning: Uhl-Bien et al., 2002
21: Creativity: Uhl-Bien et al., 2002
22: Organizational adaptability: Uhl-Bien et al., 2002
23: More complex network: Yammarino et al., 2012
24: SMT performance: James et al., 2007
25: Service outcomes: Fitzgerald et al., 2013
26: Organizational performance: Meier and O’Toole, 2001
27: Learning: Heck and Hallinger, 2009
28: Organizational development: Harris et al., 2007
29: Effective change outcomes: Fitzgerald et al., 2013
30: Organizational change: Harris et al., 2007
31: Empowerment: George et al., 2012; Huang et al., 2010
32: Organizational commitment: Dolatabadi and Safa, 2010
33: Organizational performance: Hallinger and Heck, 2010; Meier and O’Toole, 2002
34: Collective learning: Jameson et al., 2006
35: Trust: Jameson et al., 2006; Yammarino et al., 2012; Mandell and Keast, 2009
36: Leadership effectiveness: Friedrich et al., 2009
37: Increased expertise: Yammarino et al., 2012
38: Change: Denis et al., 2001
39: Satisfaction: Yammarino et al., 2012
40: Loyalty: Yammarino et al., 2012
41: Team/organizational process: Friedrich et al., 2009
42: Team member collectivism: Hiller et al., 2006
43: Affective climate: Yammarino et al., 2012
44: Member satisfaction: Gastill, 1994; Bass, 1990; Stogdill, 1974
45: Morale: Bhatti et al., 2012; Anderson, 1959
46: Involvement: Hackman and Johnson, 1996
47: Commitment: Hackman and Johnson, 1996
48: Lengthy debate over policy: Denhardt and Denhardt, 2003
49: Task performance: Huang et al., 2010
50: Employee performance: Lam et al., 2015
51: Innovation: Miao et al., 2014
52: Lower levels of stress: Harris and Ogbonna, 2002
53: Job satisfaction: Harris and Ogbonna, 2002
54: Emotional exhaustion: Mulki et al., 2006
55: Employee participation: Kahai et al., 2004
56: Organizational commitment: Dolatabadi and Safa, 2010
57: Mental model convergence: Dionne et al., 2010; Somech, 2005
58: Shared goals: Avolio et al., 2009
59: Group goal attainment: Lwin and Hirose, 1997
60: Network outcomes: Leithwood and Azah, 2016
61: Access to resources: Levine and White, 1961
62: Leader effectiveness: Balkundi and Kilduff, 2006
63: Network innovation: Zachardias et al., 2013
Appendix 5: Short overview of the conversations held

Design of the conversations
Several conversations with network practitioners about the 4-C model were conducted in order to offer practical insights in the applicability and practitioners’ need for the model. Therefore, it should be noted that those conversations were by no means an attempt to validate the model. Instead, semi-structured conversations took place with use of the 4-C model. First, the practitioners were asked to introduce themselves (i.e., name, function, job tenure etc.) and the network (when founded, founded by who, with which ambition or goals in mind etc.). Then, the antecedent and outcome variables tables and the model were presented to the practitioners, after which a discussion was held with use of the model about the role of the network leader in the network. In this, particular questions were probed about the **why**, **how**, and **effects** of the leadership role at hand.

Participants
The conversations were held with six practitioners out of two different networks. Table 5 below provides an overview of the participants spoken and the networks they are in.

Table 5: Overview of networks and participants

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Network 1</th>
<th>Network 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network</strong></td>
<td>General</td>
<td>General</td>
</tr>
<tr>
<td><strong>Sector</strong></td>
<td>Public sector</td>
<td>Public-private sector</td>
</tr>
<tr>
<td><strong>Participants</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number</strong></td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Function</strong></td>
<td>3 network leaders.</td>
<td>1 network leader, 2 network participants (one from a school and from an organization).</td>
</tr>
<tr>
<td><strong>Job tenure</strong></td>
<td>Ranging from 1 to 3 years (with the latter being the full network’s existence), with an average of 2.3.</td>
<td>Ranging from 1 to 14 years (with the latter being the full network’s existence), with an average of 7.7 years.</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td>2 Men, 1 woman</td>
<td>3 Women</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>Ranging from 42 to 62 years, with an average of 52.</td>
<td>Ranging from 29 to 51 years, with an average of 41.3 years.</td>
</tr>
</tbody>
</table>
Procedures
The conversations were held individually and face-to-face at the location of the network participants, except from one conversation that was conducted via the telephone. Afterwards the recorded conversations were transcribed and the results discussed by the researchers. This led to the three lessons learned as discussed in the practical implications.