How to Become Central in an Informal Social Network: An Investigation of the Antecedents to Network Centrality in an Environmental SCM Initiative

Barbara K. Wichmann[1], Craig R. Carter[2], and Lutz Kaufmann[1]

[1]*WHU – Otto Beisheim School of Management*
[2]*Arizona State University*

Environmental supply chain management (SCM) initiatives often evolve as informal, grassroots efforts that are driven by policy entrepreneurs at lower management levels in an organization. These individuals usually are not in positions of power or authority to convince others to support the initiative. They thus rely on central positions in informal networks to gain access to and influence over other employees to be better able to sell these initiatives. This study examines how individuals arrive at positions of centrality within the networks surrounding environmental SCM initiatives. Linking social network theory and social capital theory with findings from the organizational behavior and environmental arena, the study investigates how an individual's proactive personality and commitment profile—affective, normative, and continuance commitment—might affect network centrality through the mediating role of championing behavior. Investigating the implementation of an environmental SCM initiative at a multinational enterprise, the authors identified a 90-actor social network surrounding the initiative. The results provide evidence that championing behavior fully mediates the relationship between commitment and network centrality and to a lesser extent between proactive personality and network centrality. These findings suggest that championing behavior can enable an actor to become more central in social networks. Further, the results indicate that in an environmental SCM context, engendering the right type of commitment is a much more important driver of championing behavior than the proactive personalities of individual actors. This finding suggests that even employees who do not have proactive personalities can champion environmental initiatives and become central within the informal networks that surround these initiatives, if they strongly desire to support the initiative and believe that the initiative will lead to positive change.

Keywords: environmental supply chain management; social networks; centrality; proactivity; commitment; championing behavior

INTRODUCTION

Environmental sustainability is one of the megatrends that requires enhanced supply chain and logistics practices (Fawcett et al. 2011). However, extant research has shown that environmental supply chain management (SCM) initiatives often entail significant changes to accustomed or standard operational processes, resource allocation, and reward systems. Consequently, these initiatives can be met with skepticism and resistance from employees who serve in various functions in the organization (Drumwright 1994; Carter and Dresner 2001; Berns et al. 2009). This resistance makes successful implementation of environmental SCM practices especially challenging because these practices are frequently of a cross-functional nature (Handfield et al. 1997), and often evolve as informal, bottom-up, grassroots initiatives (Grant 2012) that are promoted by "policy entrepreneurs" at the lower management levels of an organization (Drumwright 1994; Carter and Jennings 2004; Carter et al. 2007). These policy entrepreneurs usually are not in positions of power from which they can convince their colleagues and top management to support the initiative (Drumwright 1994; Adams 2004). Accordingly, prior qualitative environmental research has suggested that policy entrepreneurs instead rely on central positions in informal networks. These positions offer them access to other employees, which allows them to better sell environmental initiatives (e.g.,

Drumwright 1994; Carter and Dresner 2001). Carter et al. (2007) seek to identify which factors lead to individual influence in environmental SCM initiatives and find that centrality in the informal networks surrounding such initiatives is the primary basis for influence and in fact dominates other potential sources of influence, such as tenure or rank in the organization. This finding aligns with social network research, which has empirically demonstrated that network centrality in organizations is a key driver of an individual's ability to influence others in the organization (e.g., Brass 1984; Ronchetto et al. 1989; Battilana and Casciaro 2013).

To date, research has mainly investigated the *position* of an actor in a network and its effect on *outcomes*, such as actor influence and performance (e.g., Ronchetto et al. 1989; Balkundi and Harrison 2006; Carter et al. 2007). However, the equally important question of *how* actors arrive at central positions in informal networks has been raised by only a few researchers in a general organizational management context (e.g., Klein et al. 2004; Liu and Ipe 2010). For example, Klein et al. (2004) examine individuals' demographic characteristics, values, and personality as antecedents to central positions in social networks, and Liu and Ipe (2010) investigate the role of personality traits, interpersonal citizenship behavior, education, and team tenure as antecedents to an individual's network centrality. These two studies represent important contributions to the organizational management and social network literature. In this important but embryonic research area, however, we see a lack of social network research in the SCM discipline in general, and in the environmental SCM context in particular. In support of this observation, Fawcett and Waller (2011b) argue that the logistics and supply chain

Corresponding author: Craig R. Carter, Arizona State University, W.P. Carey School of Business, P.O. Box 874706, Tempe, AZ 85287, USA; E-mail: crcarter@asu.edu

literature needs "research that helps (...) to more fully comprehend the how and why, not just the what" (p. 292). To illustrate, SCM is the "value-creation engine of the modern organization" (Fawcett and Waller 2013, p. 183). To ensure that SCM can keep up with this role, Fawcett and Waller (2013) suggest that more research is needed that provides insights about how "to create exceptional economic and social value" (p. 187). Given the potential difficulties in embedding environmental practices in SCM (e.g., Giunipero et al. 2012; Golicic and Smith 2013; Pagell and Shevchenko 2014), supply chain managers need to better understand how this value (i.e., achieving better environmental performance) can be created. This call for a better understanding also aligns with the work of Pagell and Shevchenko (2014), who claim that knowledge about *how* to establish truly sustainable supply chains is still insufficient. We begin to address this gap by conducting an in-depth investigation of the informal social network surrounding the implementation of an environmental SCM initiative, which leads to a deeper and richer understanding (Eisenhardt 1989; Halinen and Törnroos 2005; Flyvbjerg 2006) of how actors can become central in such networks.

Based on the analysis of a social network at a multinational company, this study builds on Carter et al.'s (2007) findings, and the prior works of Brass (1984) and Ronchetto et al. (1989), by asking a related and very important question in an environmental SCM context: "How do employees become central in such networks?" The decision to focus on environmental SCM initiatives is based on three factors: (1) the rapidly growing interest that researchers and practitioners are showing in environmental SCM practices (e.g., Linton et al. 2007; Gattiker and Carter 2010; Tate et al. 2012); (2) the potential for environmental management practices to result in improved environmental and company performance (e.g., Carter et al. 2000; Melnyk et al. 2003; Golicic and Smith 2013; Wong 2013); and (3) the ability to build on the findings of Carter et al. (2007) in this context.

The paper contributes to the existing environmental SCM literature, and in particular expands on the work of Carter et al. (2007), by applying social network theory and social capital theory to investigate the determinants of an actor's informal network centrality. We acknowledge that individual differences influence an individual's centrality (e.g., Mehra et al. 2001; Kilduff and Tsai 2003; Klein et al. 2004; Liu and Ipe 2010). Accordingly, we follow Kilduff and Tsai's (2003) recommendation to examine individual actor attributes, motivations, cognitions, and behaviors as a means to help explain the structure of social networks. We also incorporate findings from the environmental research arena and the organizational behavior arena (e.g., industrial-organizational psychology, commitment theory, and organizational change theory). And, we extend existing SCM research by investigating proactive personality, the commitment profile (i.e., the multiple dimensions of individual commitment to an environmental SCM initiative), and championing behavior as determinants of an actor's centrality. In addition, there has been scant empirical investigation of real-life social networks using social network analysis (SNA) (Kim et al. 2011). We thus contribute to the environmental SCM research by applying SNA to our investigation of environmental SCM initiatives. By doing so, we respond to Fawcett and Waller's (2011b) call for a renewed look at how we approach empirical research "to

unlock unseen, and often complex, relationships that are vital to fully understand today's decision-making environment" (p. 292). Further, because many of the hurdles that impede the implementation of environmental SCM initiatives arise at the individual level, we follow Gattiker and Carter's (2010) call for more individual-level research to examine factors that facilitate the implementation of environmental SCM initiatives. We also further advance the SCM literature by responding to a recent call for additional focus on the behavioral aspects of SCM (e.g., Bendoly et al. 2010; Katsikopoulos and Gigerenzer 2013).

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

We draw from prior studies that have used qualitative methods to generate theory. These studies examine how policy entrepreneurs develop and ultimately bring to fruition their environmental initiatives (e.g., Drumwright 1994; Carter and Dresner 2001). Drumwright (1994) shows that policy entrepreneurs reach out to others to gain their commitment for environmental initiatives. Creating these relationships seems to be an important component of environmental initiatives, which are often grassroots in nature and depend on coalitions within organizations to gain traction. Carter and Dresner (2001) also show the key role of midlevel managers who champion initiatives and inspire commitment from others by reaching out and "selling" environmental initiatives to other employees. These prior qualitative studies thus emphasize both the importance of developing informal networks in environmental initiatives and the position of an actor in a network that gives the actor access to others in the organization. Such factors align with prior empirical research by Carter et al. (2007), who show a strong link between informal network centrality and influence (i.e., the ability of actors to get others to buy into an environmental SCM initiative). Thus, prior research has demonstrated that informal network centrality plays an important role in allowing an actor to sell environmental initiatives to others in the organization.

The concept of network centrality is derived from social network theory. A social network consists of actors (i.e., individuals, a group of individuals, or organizations in a supply network) who are connected by one or more ties. The ties between the actors might be formed through friendship, communication, advice-seeking and -giving, or other means (Brass et al. 2004). Social network theory emphasizes that actors are embedded in social relationships that enable or constrain behavior and access to important resources (Brass et al. 2004). According to Leavitt (1951), the extent of the connections with others in a network defines an individual's centrality. Similarly, the social capital perspective—a research stream within social network research (Borgatti and Foster 2003)—highlights the value of the connections (i.e., the relationships between the actors), instead of the actors themselves (Brass 2001; Borgatti and Foster 2003). Social capital increases when an individual gains a central position (Brass 2001). For a detailed overview of social network theory and social capital theory and its application to SCM research, see Borgatti and Li (2009) and Galaskiewicz (2011).

To date, social network research has mainly emphasized the importance of being in the right place (e.g., Brass 1984;

Balkundi and Harrison 2006; Carter et al. 2007). However, the existing research has not thoroughly investigated how individual differences influence the structure of social networks and thus an individual's centrality in an informal network (Mehra et al. 2001; Klein et al. 2004; Liu and Ipe 2010). Investigating social networks in organizations, Kilduff and Tsai (2003) argue in their conceptual work that the analysis of individual actor attributes, motivations, cognitions, and behaviors can help to shed light on the formation of social networks.

To summarize, in investigating the implementation of environmental SCM initiatives in a social network context, we draw from social network theory, social capital theory, organizational behavior theory—including industrial-organizational psychology, commitment theory, and organizational change theory—and environmental research. In particular, we extend the work of Kilduff and Tsai (2003), as well as the other limited research in this area (Mehra et al. 2001; Klein et al. 2004; Liu and Ipe 2010) that investigates individual characteristics (e.g., personality) as determinants of an actor's centrality. In addition, we draw from extant environmental research that investigates how environmental initiatives are managed and brought to fruition (e.g., Drumwright 1994; Carter and Dresner 2001; Carter et al. 2007; Gattiker and Carter 2010). These studies consistently focus on policy entrepreneurs and their strong commitment to the environmental initiative they champion.

Drumwright (1994) describes policy entrepreneurs as being proactive and highly persistent. According to her, these individuals are willing to go above and beyond their normal job requirements to make an environmental initiative successful. Other environmental studies report similar findings (e.g., Carter and Dresner 2001; Carter et al. 2007). Based on these works, personality—and in particular, a proactive personality—seems to be paramount in the environmental arena. In addition, commitment theory argues that this "extra-role" behavior (i.e., the championing behavior) is usually fueled by an individual's commitment to the subject matter. Thus, the commitment of an actor seems to be key—not only in the organizational behavior literature (Herscovitch and Meyer 2002), but also in the environmental arena (e.g., Drumwright 1994; Gattiker and Carter 2010; Cantor et al. 2013). Linking the theories described and the different findings, we thus propose that the following factors play a significant role in explaining the formation of an actor's informal position in the network of employees who engage in an environmental SCM initiative: (1) proactive personality, (2) the commitment profile, and (3) the championing behavior of an actor.

In particular, we suggest that a proactive personality and the commitment profile—defined as a mind-set reflecting affective, normative, and continuance commitment (Herscovitch and Meyer 2002)—affect network centrality through the mediating role of championing behavior. In addition, we propose that a proactive personality also directly affects centrality. We consider a proactive personality—a key theoretical *trait*—to be an attribute of an individual actor which is one of the most important attributes for individuals confronted with ambiguous and uncertain situations at work (Griffin et al. 2007; Grant and Ashford 2008). This assumption is consistent with Fuller and Marler (2009), who state that "the personality trait that may best fit the profile for individual success in today's ever-changing environment [is a]...

proactive personality" (p. 329). We consider commitment—a psychological *state* that raises the probability that an individual will take action (Meyer and Herscovitch 2001)—to be an actor's cognition toward the subject matter, which in our context is an environmental SCM initiative. Championing behavior is considered a proactive behavior that represents in the context of our study a course of *action* (i.e., the championing behavior for an environmental SCM initiative). Environmental research findings show that these antecedents (i.e., proactive personality, commitment, and championing behavior) are predominant in this area (e.g., Drumwright 1994; Carter and Dresner 2001; Carter et al. 2007; Cantor et al. 2013).

Network research has identified several types of informal networks at the workplace (e.g., communication, advice, and friendship networks), which are formed through employees' connections (e.g., communication, advice-seeking and -giving, friendship). Because our study investigates the implementation of environmental SCM initiatives, which usually evolve as informal, bottom-up, grassroots initiatives (Carter and Jennings 2004; Carter et al. 2007; Grant 2012), we examine communication networks. We draw on Thomason (1967), Mintzberg (1979), and Krackhardt and Brass (1994), who argue that informal communication in companies frequently takes place in such networks. The proposed theoretical framework and its relationships are shown in Figure 1.

Proactive personality and championing behavior

Proactive employees are identified as "active agents who plan and take action intending to shape tasks, skills, social relationships, and working conditions" (Den Hartog and Belschak 2012, p. 194). Bateman and Crant (1993) define the prototypical proactive personality as "one who is relatively unconstrained by situational forces, and who effects environmental change" (p. 105). According to Bateman and Crant (1993), people who have a proactive personality search for opportunities, take initiative, and persist until they achieve significant change. Conversely, the authors indicate that people who do not have a proactive personality are more likely to demonstrate modest initiative, to wait for others to initiate change, and to simply adapt to circumstances. Proactivity seems to be especially important for environmental SCM initiatives; findings indicate that these initiatives often entail significant changes to standard operational processes in organizations and can lead to skepticism and resistance by employees across functions (Drumwright 1994; Carter and Dresner 2001; Berns et al. 2009).

Research has found that proactive personality is positively related to proactive *behavior* (e.g., Crant 2000; Parker et al. 2006; Fuller and Marler 2009), which is defined as "anticipatory action that employees take to impact themselves and/or their environments" (Grant and Ashford 2008, p. 8). Such behavior can include voice behavior, career initiative, networking, taking charge, and creativity (Fuller and Marler 2009).

Because the relationship between proactive personality and championing behavior has not been established in the context of environmental SCM initiatives, we apply the above findings to our context of championing behavior in an environmental SCM initiative. We suggest that individuals who have a proactive personality should be more willing to engage in proactive

Figure 1: Proposed relationships between proactive personality, commitment, championing behavior, and centrality.
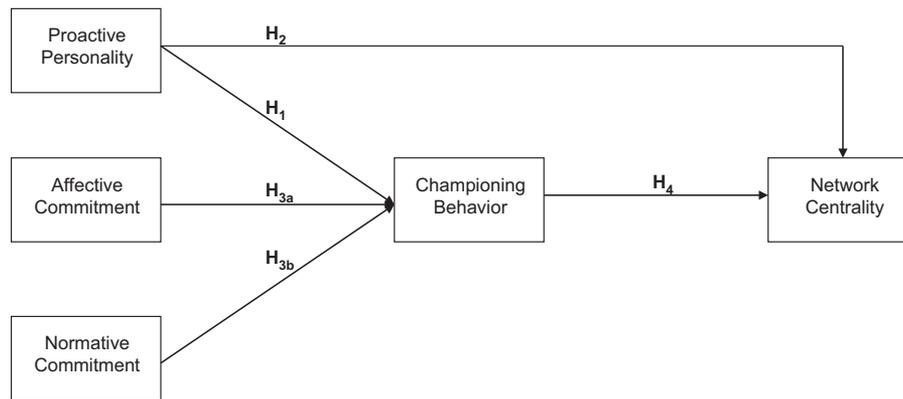
behavior. We consider championing behavior as a form of proactive behavior and thus introduce the following hypothesis:

H₁: *Proactive personality will be positively related to an actor's championing behavior for an environmental SCM initiative.*

Proactive personality and centrality

Social capital theory can also illuminate the role of a proactive personality in an organizational context. Past research has argued that social capital is vital for knowledge transfer (Reagans and McEvily 2003; Levin and Cross 2004), as well as for collective action (Putnam 1993) and efficient teamwork (Bolino et al. 2002). Taking proactive personality into account, the social capital perspective emphasizes "that proactive employees do not operate in a social vacuum" (Thompson 2005, p. 1012). Instead they search for allies and advocates who support their personal initiatives (Thompson 2005). Thus, employees with a proactive personality attempt to create a "supportive network" to achieve change in their organization (Thompson 2005). According to Thompson (2005), proactive individuals use social networking and leverage social networks for their own advantage (e.g., for access to key information or social capital).

Applying these findings to our environmental SCM context, we expect that individuals with proactive personalities are likely to initiate useful interpersonal contacts to gain support for an environmental SCM initiative and thus are likely to occupy a central position in the network of employees who engage in an environmental SCM initiative (referred to as *network centrality* in **H₂** and **H₄** which follow). For this reason, we hypothesize the following:

H₂: *Proactive personality will be positively related to an actor's network centrality.*

Commitment and championing behavior

SCM researchers have found that champions of environmental SCM initiatives possess a high level of commitment to the initiative that they champion (e.g., Drumwright 1994; Gattiker and

Carter 2010; Cantor et al. 2013). According to organizational change theory, commitment plays a key role when aiming to garner support from employees for change initiatives (Conner and Patterson 1982; Klein and Sorra 1996; Coetsee 1999). Individuals are committed to an initiative when they are emotionally inclined to support an initiative and its goals. In addition, committed individuals display persistence and strong dedication to support the implementation of an initiative (Mowday et al. 1979; Falbe and Yukl 1992). To date, commitment has mainly been studied in SCM research at the business-to-business level (e.g., Krause et al. 2007; Grawe et al. 2012).

Despite its importance, relatively little SCM literature has investigate commitment on an individual level, particularly in an environmental SCM context. Three notable exceptions exist. One exception is the work of Gattiker and Carter (2010), who investigate a champion's ability to gain commitment to an environmental initiative. Applying intra-organizational influence theory, the authors find that champions are able to gain differing levels of commitment from others in the organization to environmental initiatives, depending on the type of influence tactic the champions use. However, Gattiker and Carter (2010) operationalize their model by measuring commitment as a unidimensional construct. Recently, Cantor et al. (2012, 2013) examined the specific dimension of affective commitment, which we describe in the next section. But here again, the authors investigate only a single dimension of commitment, and they examine its effect on innovative behavior and on organizational environmental management practices, rather than on championing behavior.

In the commitment literature, it is well established that commitment can take various forms and has differing effects with respect to the nature and extent of employees' behavior (Meyer and Herscovitch 2001; Herscovitch and Meyer 2002; Meyer et al. 2007). According to Herscovitch and Meyer (2002), commitment to change consists of three dimensions and is defined as "a force (mind-set) that binds an individual to a course of action deemed necessary for the successful implementation of a change initiative" (p. 475). The authors state that the mind-set reflects three perspectives: (1) a desire to support the change because of strong agreement with the change goals (affective commitment); (2) a recognition of personal disadvantages in the case of not supporting the change (continuance commit-

ment); and (3) a sense of obligation to support the change (normative commitment). Thus, they claim that employees support a change because they (1) want to, (2) have to, and/or (3) ought to. Considering the behavioral consequences of commitment, Herscovitch and Meyer (2002) argue that this mind-set determines the degree to which an employee displays championing behavior. Accordingly, the authors find that only affective and normative commitment to change correlate significantly with championing behavior. Employees with high affective and normative commitment usually see the importance in their course of action and are hence more willing to go above and beyond minimum required actions to benefit the change initiative.

Applying these findings to an environmental SCM context, we thus expect affective and normative commitment to fuel this "extra-role behavior" (i.e., championing behavior) for an environmental SCM initiative. In particular, we expect that affective and normative commitment to an initiative lead an employee to invest time and potentially expend social capital to promote the value of the initiative to others in the organization. Because continuance commitment usually induces prevention behavior (Meyer et al. 2002, 2004), we do not expect continuance commitment to contribute to our study. We hence include this dimension of commitment as a control variable so that we can compare our findings concerning affective, normative, and continuance commitment with findings from the extant literature. We therefore introduce the following:

> **H₃:** *(a) Affective commitment and (b) normative commitment to an environmental SCM initiative will be positively related to an actor's championing behavior.*

Championing behavior and centrality

The organizational innovation literature argues that champions play a key role in the successful implementation of new business practices (e.g., Schon 1963; Maidique 1980; Howell and Shea 2001). The reason is that "an innovative idea without a champion gets nowhere" (Van de Ven 1986, p. 592). Champions often emerge informally within an organization (Schon 1963; Chakrabarti 1974) and proactively strive to initiate change in a product or business process (Schon 1963; Maidique 1980). According to Howell et al. (2005), championing behavior consists of three distinct but interrelated factors: "(1) expressing enthusiasm and confidence about the success of the innovation, (2) persisting under adversity, and (3) getting the right people involved" (p. 642).

Studying the implementation of environmental SCM initiatives, past research has found that environmental SCM initiatives are frequently promoted in an informal, grassroots manner by "policy entrepreneurs" at the lower management levels of an organization (Drumwright 1994; Carter and Jennings 2004; Carter et al. 2007). These policy entrepreneurs advocate for issues and bring them to the forefront of the corporate agenda. They are persistent, have a high energy level, and are not deterred by operational hurdles or by other actors who resist the initiative. To effectively diffuse their idea throughout the organization, policy entrepreneurs therefore reach out to their colleagues, as well as to top management. They strive to establish consensus

and to actively approach resistive employees to create an understanding of the need for the change (Drumwright 1994).

These findings can be overlaid with social network theory. Specifically, we argue that actors who show strong championing behavior are highly connected in a social network and thus occupy a central position in the network. In other words, an employee's championing behavior is what leads to a greater number of links, and thus to increased centrality within the network of employees who engage in an environmental SCM initiative. We thus hypothesize that:

> **H₄:** *The championing behavior of an actor is positively related to an actor's network centrality.*

METHODOLOGY

Identification of the focal organization and environmental SCM initiative

Following and extending the work of prior network studies, we quantitatively test our theoretical model using a single case study company (e.g., Brass 1984; Ronchetto et al. 1989; Ahuja and Carley 1999; Ahuja et al. 2003; Carter et al. 2007; Singh et al. 2010). To identify an organization and an initiative, we used critical case sampling, which is a form of purposive sampling (Neuman 2006). That is, we searched for an organization and an initiative that were insightful and provided substantial informative content for our research (Eisenhardt 1989; Yin 2009). We hence developed several criteria that the organization and the initiative needed to fulfill: The organization needed to be of a certain size to ensure that we could identify an environmental initiative with a sufficient number of actors. Thus, the organization needed to be a large company with global operations and to be active in the environmental arena. In addition, an environmental initiative needed to be identified in logistics that was already brought to fruition. This collection of retrospective data was necessary to identify all stakeholders and to clearly bound the network. The initiative also needed to be far-reaching and cross-functional to further ensure a valid number of respondents, as well as increased variability in the data (Galunic and Eisenhardt 2001). After conducting several interviews with different companies, we identified one organization that fulfilled the criteria and was willing to participate in the study.

We selected a U.S.-based, high-technology firm with global operations (referred to in this paper as Betamon). Betamon was ranked by *Businessweek* as one of the world's most innovative companies and would be considered to be an innovator using Moore's (1999) framework. In addition, Betamon is known to be one of the earliest multinational corporations to make environmental protection a corporate-wide priority. Further, the company has received numerous environmental awards and has far-reaching experiences with environmental initiatives. Betamon identified an environmental SCM initiative (referred to hereafter as TRANSPORT) that had just been implemented in its European supply chain as the potential case for our study. We assessed the viability of the initiative through initial discussions with a top executive of the company and conducted several in-person and

telephone meetings with two middle managers from the logistics/supply chain department who were the main drivers of the initiative. One of these two individuals was the actual initiative champion. During these meetings, the actors described the initiative in detail. After these conversations, the researchers and Betamon decided to move forward with the study.

The TRANSPORT initiative involved the development of a new transportation system by establishing European-wide transportation hubs. Different shipments to European customers were first consolidated in hubs, allowing them to be shipped to their destination in fully loaded trucks. To effectively load the trucks, the initiative also established methods to allow double stacking the goods, such as improving the packaging and installing a second floor in the trucks. Before the implementation of the initiative, each manufacturing plant or warehouse sent its shipments directly to customers across Europe.

The initiative was a complex undertaking driven by the main champion's personal initiative and his primary motivation to improve the company's environmental performance (i.e., to reduce pollution and/or waste). The initiative began as an informal grassroots initiative in the logistics department of the European headquarters and involved mainly lower- and middle-level managers of the manufacturing, transportation, warehousing, planning, sourcing, information technology, packaging engineering, and lean six sigma areas. With respect to final decisions, top management was involved as well. The TRANSPORT initiative was first introduced and implemented in the country where the European headquarters was located as well as in France, Germany, Italy, Poland, Spain, and the United Kingdom, which represent Betamon's main divisions. After its success was proven, other countries (e.g., Switzerland and Austria) also implemented the initiative.

Betamon reported to the researchers that with the implementation of the initiative, truckload utilization was doubled. Accordingly, the company saw a reduction of 3.1 million truck-miles per year (a 10% decrease in CO_2 emissions).

Data collection

We collected our data following Carter et al.'s (2007) social network data collection procedure. We first conducted surveys with the initiative champion and the core initiative team (i.e., employees who were engaged from the earliest stages of the initiative and who supported the initiative throughout its implementation). (The questions used to bound the network and the study's scale items are displayed in Appendices A and B, respectively.) We administered the surveys in-person, as well as via telephone, so that we could identify the names of other actors in the network using a snowballing technique (Moriarty 1983). We thus asked actors to name other actors with whom they had interacted on at least a monthly basis, on average, to get their buy-in to the initiative. We then contacted these additional actors and scheduled their in-person survey. This process lasted until no other actors were identified in the network. Using this process, we identified and surveyed 156 potential network actors.

We used the following criteria to bound the network: (1) the actor was an employee of the company located in the European headquarters or in one of the following countries: France, Germany, Italy, Poland, Spain, and the United Kingdom. (2) The

actor had a reasonable amount of discretion to decide whether to support the initiative and to what extent. (3) In cases where criterion 2 was not met, we investigated whether this actor reached out to other actors to get buy-in for the initiative, and if so, we included this actor in the network. Before ultimately excluding an actor, we conducted a short interview with the actor, as well as an additional interview with the initiative's main champion to verify the exclusion of this actor. The final sample consisted of 90 of the original 156 actors who met these criteria. Appendix C provides a description of the sample.

The in-person surveys were conducted during an intense 10-week time period, which began immediately after the last phases of the TRANSPORT initiative were implemented. After giving a brief introduction to the study, a member of the research team described the TRANSPORT initiative to enhance the memory of the respondent and to increase salience. Next, the research team member gave the questionnaire to the respondent, who read and completed it. This approach helped to minimize possible interviewer effects while still allowing a member of the research team to be available to clarify questions if necessary.

Measures

Established scales were used for the study's constructs (Churchill 1979; Flynn et al. 1990). Unless otherwise stated, all items were rated on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The items, along with the associated means and standard deviations, are displayed in Appendix B. We assessed *proactive personality* using a 4-item subset of Frese et al.'s (1997) personality questionnaire. We assessed employees' *championing behavior* for the environmental SCM initiative using a 3-item scale, building on Herscovitch and Meyer (2002) and Howell et al. (2005), along with Herscovitch and Meyer's (2002) behavioral continuum item, which represents a range of resistance and championing behavior. Following Herscovitch and Meyer (2002), we labeled the anchor points along the continuum from left ("0") to right ("100") as *actively resisting the initiative* to *fully championing the initiative*. To adapt the behavioral continuum to the multi-item scale of championing behavior (a 7-point Likert-type scale), we divided the scores by 14.43 (i.e., 101/7). We used Herscovitch and Meyer's (2002) scales to measure *affective commitment* and *normative commitment* using a 4-item subset of their 6-item questionnaire for each type of commitment.

The software UCINET 6 (Borgatti et al. 2002) was used to compute the measures of outdegree and betweenness centrality for each actor, which were derived from the actor's position within the network. We then normalized the individual dimensions following prior organizational and SNA research (e.g., Ronchetto et al. 1989; Borgatti et al. 2002; Carter et al. 2007). (See appendix A of Carter et al. [2007] for illustrations of these calculations and in-depth descriptions of the different dimensions of centrality.) We operationalized network centrality by creating an aggregate along the continuum ranging from 0 to 1, indicating that the higher the value, the closer the actors are linked in a network. Creating an aggregate was purposeful, because our study demonstrated a high and significant correlation between the two centrality measures (0.63; $p < .0001$), which allowed us to use the average measure of the components and thus to replicate

prior findings (see also Ronchetto et al. 1989; Carter et al. 2007).

We also examined the following control variables that might affect centrality and championing behavior: organizational tenure, business function, individual experience, continuance commitment, and social desirability bias. For instance, Mehra et al. (2001) argue that the higher the *organizational tenure*, the more likely an individual socializes and occupies a central position. This finding is in accordance with researchers who consider organizational tenure as a proxy for the "knowledge of how to navigate the political waters" to achieve a certain outcome (Kimberly and Evanisko 1981, p. 696). Further, we treated *business function* (i.e., logistics, manufacturing) as a control variable because employees from different business functions might display different attitudes toward environmental initiatives (Gattiker and Carter 2010). These differences might result from conflicting interests caused by differences in temporal orientation or reward systems (Lawrence and Lorsch 1967). We also controlled for whether *individual experience* (i.e., prior involvement in environmental initiatives) affects championing behavior for environmental initiatives and an actor's informal network centrality. Prior studies argued that an individual's experience is proportional to an individual's network position (Lincoln and Miller 1979). This finding might result from the fact that these individuals, based on their experience, are more likely to initiate coalitions to support an initiative. Thus, more experienced employees might display stronger championing behavior and might hold a more central position than nonexperienced employees. As mentioned, we did not hypothesize an effect of *continuance commitment* on championing behavior. However, to replicate prior findings, we included this third dimension of commitment as a control variable. Because we used self-based scales in our study, which increases the potential for social desirability bias (Nederhof 1985; Armacost et al. 1991), we also included an abbreviated version of the Crowne and Marlowe (1960) scale for *social desirability* bias as a control variable to detect this type of bias.

To lower the likelihood that respondents gave more socially desirable responses, we informed each respondent prior to distributing the self-administered questionnaire that their answers would remain strictly confidential and would not be shared with anyone in the company (Betamon). We also assured respondents of the acceptability of all answers ("no right or wrong answers"), and we asked them to answer as honestly as possible (Nederhof 1985; Podsakoff et al. 2003). We found no relationship between the social desirability scale described and the responses to proactive personality, commitment (affective and normative), and championing behavior, which suggests that this bias did not affect our data.

To reduce common method bias, we obtained the measures of our exogenous and endogenous constructs from different sources. In particular, exogenous constructs were derived from perceptual data using Likert-type questions; the endogenous centrality variable, derived via UCINET 6, was based on open-ended questions, aggregated across respondents. According to Podsakoff et al. (2003), deriving exogenous and endogenous constructs from different sources helps to reduce common rater effects. The study's design involved a self-administered questionnaire that included different response formats (e.g., Likert-type questions and questions answered by rating along a contin-

uum). We also pretested the items of the questionnaire with seven experts from the environmental SCM field, as well as with eight employees from different companies, to ensure clarity and readability of the items (e.g., Peterson 2000; Podsakoff et al. 2003).

Although the design considerations were intended to mitigate common method bias, we performed a Harman's (1967) single-factor test to identify potential common method bias. All variables were subjected to a single exploratory factor analysis. The unrotated factor solution revealed five factors with eigenvalues >1, which explain 72.6% of the variance (32.7%, 12.9%, 10.6%, 9.9%, 6.5%). This result indicates that there is no significant common method bias in our data.

MEASUREMENT AND STRUCTURAL MODEL RESULTS

Measurement model results

Before testing the study's hypotheses, we evaluated construct validity. We thus subjected the scale items to a factor analysis using the FACTOR procedure in SAS (Version 9.2; Cary, NC) because a factor analysis using the CALIS procedure in SAS (or a similar approach in LISREL, EQS, or other comparable software) would have required a larger sample size (MacCallum et al. 1992). The results of the factor analysis are shown in Table 1. Each item loaded on the appropriate factor (with a factor loading greater than .50) and did not load on any other factors, with the exception of CHB4, which represents Herscovitch and Meyer's (2002) behavioral continuum item. The CHB4 item loaded on both the affective commitment construct and the championing behavior construct. When we went back to the questionnaire and compared the championing behavior items with CHB4 and the items for affective commitment, we realized that CHB4 could have been interpreted by respondents as being similar to the affective commitment items. Thus, the CHB4 item was not used to measure championing behavior.

Cronbach's Coefficient Alpha was used to assess construct reliability (see Appendix B). The values ranged from .71 for the proactive personality construct to .90 for affective commitment and thus exceeded the minimum recommended threshold value of .70 for established scales (Churchill 1979; Van de Ven and Ferry 1979; Flynn et al. 1990); in the case of centrality, the correlation between the two network centrality measures was both large (.63) and statistically significant ($p < .0001$). To test for discriminant validity, we assessed the average variance extracted (AVE), which exceeded the acceptable value of .5 for variance extraction (i.e., the values ranged from .52 for the proactive personality construct to .76 for the centrality construct) (Fornell and Larcker 1981; Garver and Mentzer 1999). Further, we compared the AVE for each construct to the squared correlations between these constructs. All AVE estimates were greater than the square of the correlations and thus provide support for discriminant validity (Fornell and Larcker 1981) (see Appendix D). The high factor loadings and the high levels of Coefficient Alpha suggest that the study's measurement model has both convergent validity and reliability. Table 2 shows the descriptive statistics and the correlation matrix of the constructs.

Table 1: Factor analysis

	Affective commitment	Continuance commitment	Normative commitment	Championing behavior	Proactive personality	Network centrality
PP1	14	−15	−9	6	**71***	−23
PP2	11	21	−15	26	**68***	−8
PP3	3	−6	15	−4	**82***	2
PP4	4	−13	14	13	**68***	27
CHB1	38	−9	20	**72***	10	5
CHB2	8	−2	19	**82***	13	13
CHB3	27	−9	11	**84***	6	10
CHB4	**51***	−26	11	55*	24	18
AC1	**87***	−12	17	16	0	2
AC2	**76***	−22	8	9	7	11
AC3	**85***	−3	17	21	17	−3
AC4	**89***	1	15	23	6	1
NC1	11	29	**70***	19	2	−1
NC2	12	19	**81***	29	4	10
NC3	19	8	**82***	26	−1	−3
NC4	16	4	**80***	−11	3	−1
CC1	−5	**74***	6	2	−13	−11
CC2	−21	**86***	11	−9	−6	5
CC3	−10	**90***	21	−14	4	−1
CC4	−5	**90***	13	−5	0	−7
NBetween	5	−1	−14	8	6	**90***
NOutdegree	6	−13	16	18	−10	**83***

Notes: *Factor loading greater than or equal to .50.
PP, proactive personality; CHB, championing behavior; AC, affective commitment; NC, normative commitment; CC, continuance commitment; NBetween, normalized betweenness centrality; NOutdegree, normalized outdegree centrality.

Table 2: Descriptive statistics and construct correlation matrix

	Mean	SD	1	2	3	4	5	6	7	8	9
(1) Centrality	0.02	0.06	1.00								
(2) Championing Behavior	5.92	0.83	.29**	1.00							
(3) Proactive Personality	5.80	0.54	−.01	.28**	1.00						
(4) Affective Commitment	6.05	0.84	.14	.52***	.24*	1.00					
(5) Normative Commitment	4.60	1.42	.13	.39**	.11	.34**	1.00				
(6) Continuance Commitment	3.48	1.43	−.14	−.15	−.11	−.22*	.25*	1.00			
(7) Social Desirability	0.67	0.23	.12	.10	−.08	−.08	.12	−.02	1.00		
(8) Individual Experience	0.57	0.50	.11	−.05	.06	.05	−.07	−.00	−.01	1.00	
(9) Organizational Tenure	16.71	7.99	.05	−.19†	−.04	−.10	−.17	−.08	−.08	−.09	1.00

Notes: †$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$.
SD, standard deviation; Continuance commitment generally correlates negatively with affective commitment and positively with normative commitment (e.g., Herscovitch and Meyer 2002; Meyer et al. 2007).

Structural model results

We next performed a path analysis using the CALIS procedure in SAS (Version 9.2) to test the study's hypotheses, where each of the multi-item scales was transformed into a manifest variable. The results of the path analysis are shown in Figure 2, which displays the standardized parameter estimates, standard errors, *t*-values, and R^2-values. The values of the goodness-of-fit index (.99),

chi-square to degrees-of-freedom ratio (.0366/2), root mean square error of approximation (.00), comparative fit index (1.00), adjusted goodness-of-fit index (.99), root mean square residual (.00), and standardized root mean square residual (.00) suggest an excellent fit between the data and the hypothesized path model. With the exception of continuance commitment, which was significantly related ($p < .05$) to affective commitment (−.22) and normative commitment (.25) (see Table 2), none of

the study's control variables were significantly related to the model variables displayed in Figure 2. In addition, none of the paths among these variables changed when the control variables were included.

H_1 proposed a positive relationship between proactive personality and championing behavior. The path coefficient of .16 ($t = 1.79$) is marginally significant at $p < .10$, providing *moderate support* for H_1. H_2 posited a positive relationship between proactive personality and an actor's centrality. The path coefficient of $-.10$ ($t = -0.90$) is not significant, and thus H_2 is *not supported*. H_{3a} and H_{3b} proposed positive relationships between affective commitment and championing behavior and between normative commitment and championing behavior, respectively. Both of these paths were positive and significant, providing *support* for H_{3a} ($t = 4.27$, $p < .001$) and H_{3b} ($t = 2.62$, $p < .05$). H_4, which hypothesized a positive relationship between championing behavior and centrality, was also *supported* ($t = 2.94$, $p < .01$).

We tested for mediation using Baron and Kenny's (1986) procedure and ran a path model that included both direct and indirect (mediated) paths (see Figure 3). None of the additional paths (from affective commitment to network centrality and normative commitment to network centrality) were significant, and the significance of the remaining paths did not change compared to the results of our hypothesized model displayed in Figure 2. We also performed a bootstrap method following Preacher and Hayes (2004) to test for mediation. The 95% confidence interval of the indirect effect was obtained with 5,000 bootstrap resamples. Because zero was not in the 95% confidence interval, it can be reasoned that the indirect effect is significantly different from zero at $p < .05$ (Preacher and Hayes 2004). Together, the results of the Baron and Kenny (1986) test and the bootstrap method suggest that the effects of affective and normative commitment on network centrality are fully mediated through championing behavior. Finally, we ran our analysis without championing behavior. That is, we ran a path analysis with proactive personality, affective commitment, and normative commitment as exogenous variables

and network centrality as the endogenous variable. None of the paths were significant.

Discussion

There has been a lack of knowledge about *how* to establish environmental sustainability in supply chain operations (e.g., Tate et al. 2012; Pagell and Shevchenko 2014), suggesting the need for more individual-level research to investigate success factors that facilitate the effective implementation of environmental practices (Gattiker and Carter 2010). Our study contributes to the stream of research that examines the role of centrality in informal networks and the ability of central actors to influence others and thus bring environmental SCM initiatives to fruition. To date, researchers have mainly investigated the outcomes of being centrally located within a network (Borgatti and Foster 2003). However, the question of how actors become central in informal networks surrounding environmental initiatives is also an important one to answer. Prior environmental SCM research suggests that successful policy entrepreneurs rely on central positions within informal networks and that these positions offer them access to and influence over other employees (Drumwright 1994; Carter and Dresner 2001). Our research tries to address this gap by examining *how* a key theoretical *trait*—proactive personality—and *state*—the multiple dimensions of commitment—might affect informal network centrality through the mediating role of championing behavior.

Based on our findings, we suggest that championing behavior, which occurs when an actor tries to promote the initiative to others and to overcome resistance to the initiative by other actors, enables an actor to become more central in the informal network that evolves as an environmental SCM initiative is implemented. Our research thus complements the work of Carter et al. (2007), who find that such informal network centrality leads to influence, but who leave for future research an investigation of the antecedents to network centrality.

In addition, our examination of both the hypothesized relationships (Figure 2) and the potential nonmediated relationships

Figure 2: The mediating role of championing behavior in informal network centrality.
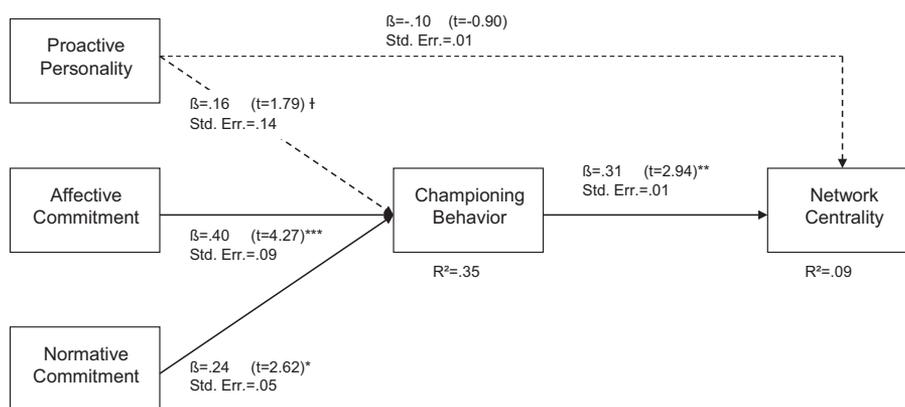
Notes: † p<.10, *p<.05, **p<.01, ***p<.001.

Figure 3: The role of championing behavior in informal network centrality: with mediated and nonmediated paths.
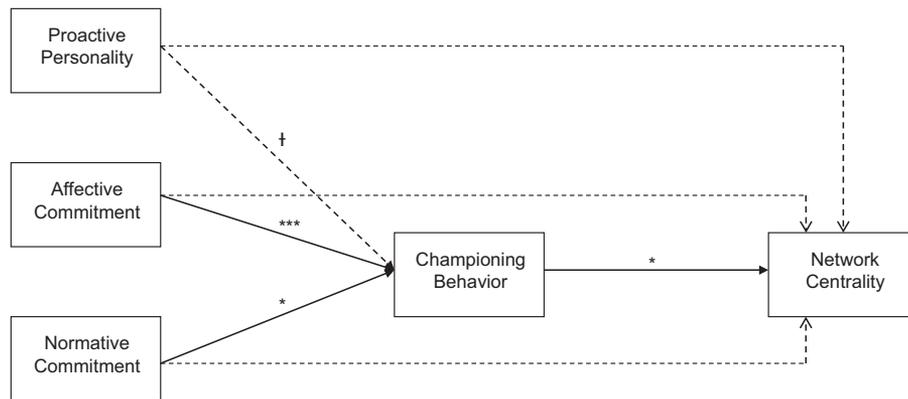
Notes: ‡ p<.10, *p<.05, **p<.01, ***p<.001.

(Figure 3) suggests that championing behavior can play a key mediating role. That is, the effect of affective commitment, normative commitment, and (to a lesser extent) the individual trait of proactive personality on network centrality is mediated through championing behavior. Interestingly, our data indicate that proactive personality, which is a relatively stable trait, might have only a moderately positive effect on championing behavior and no direct relationship with network centrality. One possible explanation is that studies reporting a positive relationship between proactive personality and proactive behavior have been conducted within the context of employees' prescribed job duties or their own careers (e.g., Crant 1995; Seibert et al. 1999, 2001; Byrne et al. 2008). However, the implementation of environmental SCM initiatives often goes beyond formal job descriptions. This could explain the lack of significance between proactive personality and network centrality: even actors with proactive personalities might be less willing to initiate interpersonal contacts and expend social capital for initiatives that go beyond their job responsibilities. In addition, although social capital theory predicts that actors with proactive personalities will engage in social networking (e.g., H_2), this direct effect might more likely be found in the more enduring organizational social networks associated with daily and ongoing work roles, as opposed to the more transitory social networks associated with environmental SCM initiatives.

Our research helps advance theory in several ways. First, our study contributes to environmental SCM theory by shedding light into the "how," and not just the "what" (Fawcett and Waller 2011b), of logistics and supply chain phenomena, and is also consistent with Pagell and Shevchenko's (2014) call for research that identifies *how* companies can create truly sustainable supply chains. Thus, our study advances environmental SCM research by investigating *how* actors arrive at central positions in informal social networks so that they can better sell environmental SCM initiatives and thus enhance the environmental performance of their organization. In addition, by investigating one pillar of sustainability (i.e., environmental sustainability), our study heeds the call for more influential SCM and logistics research that

investigates both "mega and micro trends" (Fawcett et al. 2011). Further, our research examines the implementation of an environmental SCM initiative and the formation of the corresponding social network through new theoretical lenses (i.e., social network, social capital, and organizational behavior theories), and thus makes a significant contribution to SCM theory as it helps to better understand this complex phenomenon (Fawcett and Waller 2011a).

Second, by examining the antecedents to centrality, our study contributes to social network theory concerning the relationship between network centrality and influence. Our findings thus help further the understanding of social networks and shed light on *how* some actors become more central than others in informal organizational networks.

Third, our research is consistent with problems raised by Galaskiewicz (2011). Specifically, the author is concerned that supply chain researchers applying network methodologies might "fail to recognize that what gives networks a dynamic quality and what makes networks 'work' are the underlying social meanings of the relationships to those who are party to the network" (Galaskiewicz 2011, 7). In this context he argues that "how networks are structured matters, but it is the relationships and what goes along with them that matters much more" (Galaskiewicz 2011, 7). Our study addresses this concern and thus contributes to SCM research by investigating championing behavior, as well as the types of individual-level commitment and proactivity that might fuel this behavior, as antecedents to network structure.

Fourth, our study contributes to the growing behavioral SCM literature (e.g., Bendoly et al. 2010; Katsikopoulos and Gigerenzer 2013) by integrating organizational behavior theory and investigating the individual as the unit of analysis. Accordingly, we investigate commitment at the individual level and thus further advance existing SCM research in that, with only a few exceptions, this research stream has mainly investigated commitment at the business-to-business level (e.g., Krause et al. 2007; Grawe et al. 2012). In addition, by incorporating multiple dimensions of commitment from commitment theory, we provide a more nuanced understanding and conceptualiza-

tion of individual-level commitment to environmental SCM initiatives. This approach further advances environmental SCM research because the few prior studies that have investigated individual-level commitment have used a less granular operationalization.

Fifth, our research contributes to social capital theory, which suggests that employees with proactive personalities are likely to seek out others to support their initiatives and thus are expected to be more central within social networks. Our findings suggest that proactive *behavior*—for example, championing behavior—can engender this effect, while proactivity as a *personality trait* may only have a marginal, indirect effect on network centrality. Thus, when referring to proactive individuals within a social capital perspective, we propose that this proactivity is not necessarily an enduring trait, but rather that it might differ from initiative to initiative, depending on the levels of affective and normative commitment that an employee has for a specific initiative.

MANAGERIAL IMPLICATIONS

Our research provides important insights for supply chain managers about how to more effectively sell environmental SCM initiatives in their organizations. It identifies the crucial role of championing behavior, which seems to enable managers to gain a central network position and consequently to be better able to promote environmental SCM initiatives (Drumwright 1994; Carter and Dresner 2001).

Managers who want to launch environmental SCM initiatives also need to understand that most employees are capable of engaging in championing behavior, regardless of their more stable, trait characteristics in terms of proactivity. This finding contradicts prior research findings, which have suggested that it is primarily proactive individuals who engage in proactive behaviors (e.g., Bateman and Crant 1993; Crant 2000; Fuller and Marler 2009). As a result of this perspective, managers tend to search for proactive individuals when attempting to gain support for an initiative. In an environmental context, however, this approach can be time-consuming and misleading; our results suggest instead that championing behavior for environmental SCM initiatives is driven by commitment and not necessarily by proactivity. Thus, it might be more important for managers to engender employee commitment, rather than searching for proactive individuals.

Our results also reveal that a manager might need to do more than simply say that she wants to gain the commitment of other organizational members to an environmental initiative. Instead, she might have to work to create the right type of commitment. Specifically, our results with respect to the different dimensions of commitment suggest that employees who feel pressured to support an initiative and who feel that not doing so would be risky in terms of their personal interests (i.e., our control variable, continuance commitment) might not resist an initiative, but they also might not actively engage in the initiative through championing behavior. Instead, both affective and normative commitment appear to be related to championing behavior for environmental SCM initiatives. The implication is that managers and other actors who champion an environmental SCM initiative

should therefore try to engender a commitment to the initiative based on the beliefs that the initiative is valuable, necessary, and good for the organization (affective commitment) or that behaving responsibly obligates them to support the initiative (normative commitment).

Finally, our study provides important insights into the social networks that form in organizations. This insight is significant because companies often fail to integrate environmental practices into their business operations (Golicic and Smith 2013; Pagell and Shevchenko 2014), which is usually a result of individual-level issues, such as increased skepticism and resistance (Carter and Dresner 2001; Berns et al. 2009). Thus, we demonstrate that SNA is a valuable tool to better oversee environmental SCM initiatives and to detect problems and challenges that hinder their emergence and their being brought to fruition. For example, applying SNA can allow managers to identify actors who are the primary champions of an initiative and thus central in the network, as well as actors who are stumbling blocks to effective implementation. Accordingly, managers can directly address problems and challenges by approaching the actors who seem to be resisting the initiative. In addition, being aware of who is central in a social network can help managers to more effectively allocate resources. For example, managers can provide central actors with additional manpower, managerial support, or other resources that might be needed to ensure successful implementation. Knowing who is a central player in a social network enables top managers to reward these actors for their efforts, which not only motivates these actors but also creates incentives for other employees to become central players (Cross and Prusak 2002).

LIMITATIONS AND FUTURE RESEARCH

Although the realism of our study is high, the external validity of our findings is low, given our reliance on a single organization. We therefore conducted critical case sampling and collected our data from a range of different business areas, hierarchical levels, and countries to enhance the variability in our data and its external validity (Eisenhardt 1989; Galunic and Eisenhardt 2001); nevertheless, additional research is needed to test our proposed model with larger samples. Our selection of a single organization was purposeful, based on our recognition of several factors: (1) it allowed us to increase richness and realism (McGrath 1982; Eisenhardt 1989; Flyvbjerg 2006); (2) our research design was consistent with the extant research that we were extending and to which we wanted to contribute (e.g., Fombrun 1983; Brass 1984; Ronchetto et al. 1989; Carter et al. 2007); and (3) a single company study is "an appropriate design for network research" (Halinen and Törnroos 2005, p. 1291) because of the significant pragmatic difficulty in collecting large-scale organizational network data from multiple firms (e.g., Halinen and Törnroos 2005; Kim et al. 2011). Regarding this last point, the data collection from Betamon alone involved hundreds of hours of scheduling, travel, interviewing, and time spent at Betamon's multiple locations. The difficulty of using a different approach —such as collecting data via a survey from one or a few informants from a large number of different organizations—

would clearly emerge in trying to operationalize the study's endogenous construct, network centrality.

Although the findings that surround environmental research show that our model's antecedents are predominant in this area (e.g., Drumwright 1994; Carter and Dresner 2001; Carter et al. 2007; Cantor et al. 2013), other variables, such as corporate culture, external stakeholder pressures, and top management support, could also be included as potential antecedents (Wu et al. 2014). However, because our unit of analysis was the individual within the context of an initiative at Betamon, variations in these other variables would not have been likely. Therefore, future research that examines the initiative or the company as the unit of analysis might examine these additional variables. In addition, although they are not mentioned in the extant literature that has examined environmental SCM initiatives, other individual-level variables, such as job autonomy and formalization, might also be of interest to researchers who wish to investigate the implementation of environmental SCM initiatives.

Our study used retrospective data, which is common in SCM research based on case study and survey methodologies (Giunipero et al. 2008). Miller et al. (1997, p. 189) demonstrate that such retrospective data are valid, "… if the measure used to generate the reports is adequately reliable and valid." We addressed these validity issues through our use of structured in-person surveys, which help to achieve internal validity in four ways: (1) through comparable measurement across respondents (Weller and Romney 1988); (2) through the use of established scales in collecting our data; (3) through our analysis of the empirical validity of these scales using the data from our study; and (4) through our snowballing approach and feedback loops to ensure that we had validly bounded the study's network. Still, our study consisted of a retrospective snapshot of Betamon's social network. Future research might examine an environmental SCM network longitudinally and analyze the data according to recent advances in SNA, such as dynamic network visualizations (Galaskiewicz 2011). This research approach could run the risks, however, of not having a large enough network (i.e., the researchers would have to select the initiative at its beginning and would thus not know at the outset how large the network would become) and of not knowing whether the initiative would ever be brought to fruition.

Our use of self-reported data does create the potential for social desirability bias (Nederhof 1985; Armacost et al. 1991). However, we purposefully relied on self-reports because the individual most likely can best assess his or her own commitment level and personality (Nederhof 1985). Further, using other-based reports for measuring proactive behavior can be problematic because proactive behavior often involves taking action to change accustomed practices. Such behavior can thus be negatively perceived by others who prefer the status quo, making these other-based ratings less reliable (Frese and Fay 2001). Still, we acknowledge the concern of social desirability bias and suggest that assessing data from multiple sources in subsequent research might be of value.

We operationalized individual commitment across three dimensions, consistent with extant conceptualizations and empirical findings. Future research in environmental SCM, and in broader SCM phenomena, might similarly want to consider commitment beyond the unidimensional manner in which it has largely been conceptualized and measured in the existing research. This multidimensional conceptualization and operationalization of commitment could, for instance, be adapted and applied to other facets of SCM, including interpersonal relationships in a supply chain context (e.g., Gligor and Autry 2012).

Our research investigated antecedents to an actor's network centrality in an environmental SCM context. Future research might extend our study's findings by examining other contexts, including other environmental (non-SCM) initiatives (e.g., product innovation with enhanced environmental characteristics) or other SCM (nonenvironmental) initiatives (e.g., introducing new information technology infrastructure to support the supply chain).

Finally, while the extant research has suggested that proactive personality is a key *trait* that relates to proactive behavior, our results suggest that proactive personality may play only a minor role in an environmental SCM context. Future environmental SCM research could certainly reexamine this potential relationship and also identify other possibly relevant personality traits that might affect championing behavior, such as altruism or volunteerism.

APPENDIX A

BOUNDING THE NETWORK

1. Colleagues that approached <u>you</u> in order to get <u>your</u> buy-in to the TRANSPORT initiative.

Think back to your involvement in the TRANSPORT initiative during the entire time period from the start-up of the TRANSPORT initiative until today.

Please list all individuals and their functions/business units that have interacted with you, *at least once per month, on average*, in order to get <u>your</u> buy-in to the TRANSPORT initiative. This interaction could include formal communication (such as emails and meetings) as well as informal communication (including phone calls and face-to-face conversation) surrounding the implementation and management of the TRANSPORT initiative.

2. Colleagues you approached in order to get their buy-in to the TRANSPORT initiative.

Think back to your involvement in the TRANSPORT initiative during the entire time period from the start-up of the TRANSPORT initiative until today.

Please list all individuals and their functions/business units that you have interacted with, *at least once per month, on average*, in order to get their buy-in to the TRANSPORT initiative. This interaction could include formal communication (such as email and meetings) as well as informal communication (including phone calls and face-to-face conversation) surrounding the implementation and management of the TRANSPORT initiative.

APPENDIX B

SCALE ITEMS

Constructs and measurement items	Mean	SD	α
Proactive Personality (PP)* (Frese et al. 1997)			
PP1: I actively approach problems	6.06	0.59	.71
PP2: Whenever there is a chance to get actively involved, I take it	5.57	0.72	
PP3: I use opportunities quickly in order to attain my goals	5.71	0.81	
PP4: Usually, I do more than I am asked to do	5.87	0.80	
Championing Behavior (CHB)[†] (Herscovitch and Meyer 2002; Howell et al. 2005)			
CHB1: I spoke positively about the initiative to outsiders	5.96	0.99	.84
CHB2: I tried to overcome co-workers' resistance toward the initiative	5.97	0.89	
CHB3: I embraced the initiative and "sold" it to others	5.83	0.99	
CHB4: Rating on the continuum: 0 = actively resisting the initiative; 100 = fully championing the initiative. *Eliminated due to high factor cross-loading on AC.*			
Affective Commitment (AC)* (Herscovitch and Meyer 2002)			
AC1: This initiative is good for our organization	6.22	0.91	.90
AC2: Things would be worse without this initiative	5.56	1.13	
AC3: This initiative is necessary	6.08	0.91	
AC4: I believe in the value of this initiative	6.33	0.85	
Normative Commitment (NC)* (Herscovitch and Meyer 2002)			
NC1: I would feel guilty about opposing this initiative	3.79	1.80	.84
NC2: I would feel badly about opposing this initiative	4.47	1.77	
NC3: It would be irresponsible of me to resist this initiative	4.82	1.83	
NC4: I feel an obligation to support this initiative	5.32	1.48	

Controls

	Mean	SD	α
Continuance Commitment (CC)* (Herscovitch and Meyer 2002)			
CC1: I feel pressure to go along with this initiative	4.37	1.87	.88
CC2: It would be risky to speak out against this initiative	3.21	1.65	
CC3: I have too much at risk to resist this initiative	3.15	1.52	
CC4: It would be too costly for me to resist this initiative	3.17	1.57	
Social Desirability (SD)[‡] (Crowne and Marlowe 1960)			
SD1: I am always willing to admit when I make a mistake	0.92	0.27	n.a.
SD2: I have never been annoyed when people expressed ideas very different from my own	0.46	0.50	
SD3: I am always polite, even to people who are disagreeable	0.69	0.47	
SD4: I have never intensely disliked anyone	0.47	0.50	
SD5: I never hesitate to go out of my way to help someone in trouble	0.79	0.41	
Other variables			
Have you ever been involved in another environmental initiative at your company? (*Responses: yes; no*)[§]	0.57	0.50	
How long have you worked for Betamon?	16.71	7.99	
In which function do you work (e.g., Logistics, Warehousing, Transportation, Manufacturing, Sourcing, Planning, Packaging Engineering, Information Technology)?			

Notes: *All items were measured on a 7-point Likert-type scale where 1 = *strongly disagree* and 7 = *strongly agree*.
[†]All items with the exception of CHB4 were measured on a 7-point Likert-type scale where 1 = *strongly disagree* and 7 = *strongly agree*.
[‡]Responses: 0 = *false*; 1 = *true*.
[§]To calculate the mean and SD we treated "yes" as 1 and "no" as 0.
SD, standard deviation; α, Cronbach's Coefficient Alpha.

APPENDIX C

OVERVIEW OF THE NATURE OF THE SAMPLE

Functional affiliation	Number of actors	Percentage (%)
Logistics	26	28.89
Manufacturing	14	15.56
Supply Chain*	14	15.56
Warehousing	10	11.11
Transportation	8	8.89
Planning	4	4.44
Sourcing	3	3.33
Warehousing/Transportation	3	3.33
Information Technology	2	2.22
Logistics/Manufacturing[†]	2	2.22
Packaging Engineering	2	2.22
Lean Six Sigma	1	1.11
Logistics/Information Technology	1	1.11

Number of years working for the company		
7 months–2 years	2	2.22
3–5 years	7	7.78
6–10 years	17	18.89
11–15 years	14	15.56
16–20 years	16	17.78
More than 20 years	34	37.78

Age		
Under 30 years	3	3.33
30–35 years	12	13.33
36–40 years	14	15.56
41–45 years	23	25.56
46–50 years	20	22.22
51–55 years	13	14.44
Older than 55	5	5.56

Notes: *The term "Supply Chain" refers to actors who are responsible for the management of multiple functions within Betamon's supply chain.
[†]Respondents with more than one functional affiliation reported to these multiple functions. For example, Logistics/Manufacturing respondents reported to both functions (i.e., logistics and manufacturing).

APPENDIX D

THE FORNELL-LARCKER CRITERION

	Ave	1	2	3	4	5	6
(1) Centrality	.76	1.00					
(2) Championing Behavior	.61	.08	1.00				
(3) Proactive Personality	.52	.00	.08	1.00			
(4) Affective Commitment	.72	.02	.27	.06	1.00		
(5) Normative Commitment	.61	.02	.15	.01	.12	1.00	
(6) Continuance Commitment	.71	.02	.02	.01	.05	.06	1.00

Note: AVE, average variance extracted.

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SHORT BIOGRAPHIES

Barbara K. Wichmann (Dipl, University of Tuebingen) is a research associate in the SCM Group at WHU – Otto Beisheim School of Management. Her current research focuses on sustainable supply chain management and social networks.

Craig R. Carter (PhD Arizona State University) is a Professor of Supply Chain Management in the W.P. Carey School of Business at Arizona State University, and the Co-Editor-in-Chief of the *Journal of Supply Chain Management*. His primary research stream focuses on sustainable supply chain management. This research encompasses ethical issues in buyer–supplier relationships, environmental supply management, diversity sourcing, perceptions of opportunism surrounding electronic reverse auctions, and the broader, integrative concepts of social responsibility and sustainability.

Lutz Kaufmann (Habilitation, University of Giessen) is a Professor of Supply Chain Management at WHU – Otto Beisheim School of Management, and the European Editor of the *Journal of Supply Chain Management*. His primary research streams are sustainable supply chain management, decision making in procurement, and power in supply chains.