The Status of Leadership Studies: Its Invisible Network of Knowledge

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Abstract.

This study examined the status of contemporary leadership research in the past decade, using the SSCI citation data for one of the top leadership journals, The Leadership Quarterly. This study used citation and co-citation analysis to identify the most important publications, scholars, and research themes in leadership studies, and then mapped the intellectual structure of this field. The results help to profile the invisible network of knowledge production in leadership studies, provide important insights, and have implications with regard to current and future research paradigms for both management scholars and practitioners.

Keywords: Leadership research, intellectual structure, social network analysis, network of knowledge, co-citation analysis.

INTRODUCTION

In this study, the Social Sciences Citation Index (SSCI) was used for analysis. The SSCI is a widely used database, which includes citations published in over 2,000 of the world's leading scholarly social science journals covering more than 50 disciplines. Among the journals included in the SSCI, the *Leadership Quarterly* (LQ) is arguably the most influential one publishing leadership related papers, and is thus used as the core source for analysis in this work. The advantage of using

journals instead of keywords to generate the needed citation data is the "guaranteed quality" of their published papers, and their clear boundaries with regard to what are acceptable methods and topics in the field, as defined by editorial policies of specific journals. This study includes all the works published in LQ from 2000 to 2009, a total of 443 articles, which further cited 29,971 other publications as references. The cited publications include both books and published journal articles. Based on the author co-citation analysis of ten years of research in LQ, this paper first reports the relative academic importance of authors, articles, and journals (in terms of the number of citations) in the leadership studies literature, and then points out the historical stages in the development of the field. This paper further maps the co-citation networks and reveals the top 30 authors in the ten-year period studied, and predicts the future directions of this field. Specifically, this paper focuses on the following three objectives: (1) To ascertain important papers and books in LQ based on objective citation analyses; (2) To identify the underlying network among scholars and articles in the leadership field; (3) To identify different streams of studies to suggest future directions for this field. To address these issues, the researchers will first introduce the invisible network knowledge (INK) theory, which will be used to guide our author co-citation analysis (ACA). The researchers will then use the INK approach to examine the relative contributions of authors and articles to the field of leadership. Third, the researchers use the network analysis technique to map the network among authors and articles to evaluate the disciplinary trends in leadership. Finally, the researchers provide a discussion of this study's analyses and provide some directions for future work in this field.

LITERATURE REVIEW

Theory of the invisible network of knowledge

Since people harbor their own views on knowledge, there can be a lack of clarity concerning specific actions to be taken in the quest for more knowledge. Therefore, there is a need for a channel that helps people to visualize knowledge and develop and maintain a common visualization and representation it (Price, 1965). Gibbons et al. (1994) hold that the terms of science and knowledge are often used interchangeably or combined to form scientific knowledge, and that scientific knowledge is usually presented in journal articles, books, and monographs, as noted above. The pieces of knowledge in a particular field are developed based on each other and connected with each other through citations and co-citations. From this network perspective, the knowledge network of any single discipline, such as leadership, could be viewed as an offshoot of the interaction of its foundational domains. The researchers believe that further development of leadership research can benefit from a network analysis, i.e., an author citation and co-citation analysis, of the field. This analysis will help us to combine the knowledge gained from previous studies and to explore the nature, potential uses, and evolution of the field over time.

Concept of invisible network of knowledge (INK)

Networks have long been used in engineering and science to manage complex systems, where they commonly refer to systems (webs) of interlinked subsystems (or components), each of which is optimally designed to effectively perform a designated task. Each subsystem is highly specialized and generally draws on high quality (Jones et al., 1992) accumulated knowledge and leadership. By the optimal interlinking of these subsystems, a considerably broader and more complex range of functions and capabilities than those contained in the individual subsystems is realized. Although the system as a whole may not be truly optimal, it can still be effective and flexible enough to execute tasks significantly better than its individual parts.

Francis and Peter (1993) proposed that invisible colleges can be beneficial to a researcher because they can be of assistance in: (1) identifying colleagues working on the same or related areas; (2) acquiring knowledge from peers and inquiring about relevant topics in person or through the literature; and (3) formulating answers to these questions and communicating views via professional media, such as journals. These journals (particularly the major journals in each discipline) function elegantly and smoothly in the academic world.

Based on the understandings outlined above, Etemad and Lee (2003) first analogized a knowledge network as an airline map, and defined the network in knowledge creation as an "interlinked" web of "knots and nodes" that is "loaded" with a "concentration of resources" scattered over a landscape that constitutes the domain of that subject. Later on, Ma et al. (Ma, et al., 2007, Ma & Wang, 2007) created the new concept of "an invisible network of knowledge production in a discipline (an INK Model)", and this will be used for this study. The INK of a field will help us to gain an initial understanding of the nature, potential uses, and the evolution of that field over time. It can be viewed as a repository of broad and complex sets of expertise, experience, and accumulated knowledge. Further, it has certain key nodes and is enhanced by many linkages, from which both internal and external members can draw. Therefore, an INK is formed after (1) "nodes and knots" become loaded with knowledge resources (i.e., authors, articles, or journals); (2) these "nodes and knots" develop ties and linkages among themselves through co-citations (Podolny et al., 1996); and (3) these ties synergistically amalgamate their resources, which in turn results in strengthening, broadening, and deepening the functional capabilities of both the network and its members (i.e., the research field as a whole).

A given INK embodies both the knowledge content of its nodes and the inter-linkages among the nodes within it, and can be viewed as the organized and the de facto representation of the knowledge content of a field. Chandy and William (1994) stated that any localized knowledge network (in this study, the authors replaced knowledge network with INK) is a part (or subsystem) of a broader and more general system. In the case of leadership research these foundation disciplines

include management, psychology, sociology, political science, public administration, educational administration, organization behavior and human resource management. In the current study, the researchers will use the concept of INK to develop a network portrait of the leadership field in order to reveal a comprehensive and objective understanding of the evolution of this field.

RESEARCH METHODOLOGY

Identification of databases and design of search processes

Most of the disciplines mentioned above are well established and have their own publication media. With the identification of potential databases containing leadership-related raw materials, appropriate search procedures need to be adopted. Historically, three search strategies have been used to build the databases for citation and co-citation analysis: the keyword, journal, and title approaches. The current researchers adopted the journal approach, since the advantage of using journals instead of keywords to generate the needed citation data is the "guaranteed quality" of their published papers and the clear boundaries of specific journals. To acquire published studies related to leadership, the researchers searched the SSCI online and found 29,971 citations. The objective of this study is to focus on 443 articles in all the issues of the LQ published between 2000 and 2009.

Data set and co-citations analyses

Citations are considered to be an authentic and reliable indicator of scientific communication (Small, 1978; Garfield, 1979) and are the basis for the identification of "invisible colleges," i.e., research networks that refer to each other in their documents without being linked by formal organizational ties (Price, 1965; Crane, 1972; Lievrouw, 1989). Co-citation is the frequency with which two documents or authors are cited together (Alger, 1996). The essential notion is that the more frequently the two publications are co-cited, the stronger is the links between them. In co-citation analysis, the data compiled are counts of the number of times two works, such as individual documents, authors' oeuvres, and/or journal titles, are jointly cited(McCain, 1991). Therefore, co-citation analysis is considered an efficient method to measure the relationships and linkages between authors, papers, and journals to describe the mainstream, or at least the leading edge, in scientific research (Tsay, 2003).

In the current analyses, the researchers employ bibliometrics (Etemad & Lee, 2003) to accomplish the following goals: (1) map the co-citation networks of the leadership studies over the past ten years; and (2) examine the links between the important scholars who authored key articles on leadership research. The general procedure for co-citation analysis has the following four steps: (1) compilation of a raw co-citation matrix; (2) conversion of the data matrix to a correlation matrix; (3) analysis of the correlation matrix through non-metric multidimensional (MDS), cluster analysis,

and/or network analysis; and (4) interpretation and validation of the results (Alger, 1996; McCain, 1991). The software the researchers used to conduct these analyses is Ucinet 6.0 for Windows (Borgatti, Everett, and Freeman, 2002), and the results are described below.

RESULTS

The Main Journals

To identify the key publications and scholars that have laid down the foundations for leadership research, the researchers tabulated the citation data for each of the 443 source documents and 29,971 references using the *MS Excel* software package. The citation analysis produced interesting results, as shown in the following tables. Table 1 lists the most cited journals in the leadership field in the past decade, among which *The Leadership Quarterly*, *Journal of Applied Psychology*, *Academy of Management Journal*, and *Academy of Management Review* are the top four, followed by *Journal of Personality and Social Psychology*, *Administrative Science Quarterly* and *Journal of Management*.

Network analysis of authors

Due to the mature research taking place in the leadership field, this phase of the analysis attempts to capture the prevalent trends. The researchers selected the 30 most highly cited scholars in two different periods, 2000–04 and 2005-09, with the results presented in Tables 2 and 3, respectively. The researchers then employed these scholars as key nodes before conducting a factor analysis. The results are given in Fig. 1 and 2.

Table 1

Main Journals and Book Reference Distribution from 2000 to 2009

(Citation Frequency$ 91)

LEADERSHIP QUART	2,839	STRATEGIC MANAGE J	164
J APPL PSYCHOL	1,593	ORGAN DYN	159
ACAD MANAGE J	980	CHARISMATIC LEADERSH	158
ACAD MANAGE REV	938	LEADERSHIP ORG	158
J PERS SOC PSYCHOL	625	CREATIVITY RES J	146
ADMIN SCI QUART	590	PERS SOC PSYCHOL B	141
J MANAGE	566	LEADERSHIP PERFORMAN	136
PSYCHOL BULL	345	ACAD MANAGE EXEC	129
ORGAN SCI	342	J APPL SOC PSYCHOL	114
J ORGAN BEHAV	316	LEADERSHIP	109
HUM RELAT	293	GROUP ORGAN MANAGE	103
RES ORGAN BEHA	280	J MANAGE STUD	100
PERS PSYCHOL	274	PSYCHOL REV	97
AM PSYCHOL	261	ANNU REV PSYCHOL	96
ORGAN BEHAV HUM DEC	236	BASS STOGDILLS HDB L	94
ORGAN BEHAV HUM PREF	219	SMALL GR RES	94
HARVARD BUS REV	165	ADV EXPT SOCIAL PSYC	91

The Status of Leadership Studies: Its Invisible Network of Knowledge

Table 2

Top Authors Selected for the Co-citation Analysis from 2000 to 2004

(Citation Frequency $ 20)

Bass BM	191	Podsakoff PM	36	Lowe KB	26
House RJ	158	Howell JM	35	Kerr S	25
Yukl G	90	Dansereau F	34	Mintzberg H	25
Conger JA	73	Burns JM	33	Vroom VH	25
Shamir B	69	Avolio BJ	32	Meindl JR	24
Mumford MD	64	Eagly AH	29	Fleishman EA	23
Hunt JG	61	Schriesheim CA	29	McClelland DC	22
Lord RG	53	Yammarino FJ	28	Goleman D	21
Zaccaro SJ	46	Fiedler FE	27	James LR	21
Graen GB	45	Klein KJ	27	Bandura A	20

Table 3

Top Authors Selected for the Co-citation Analysis from 2005 to 2009

(Citation Frequency $ 31)

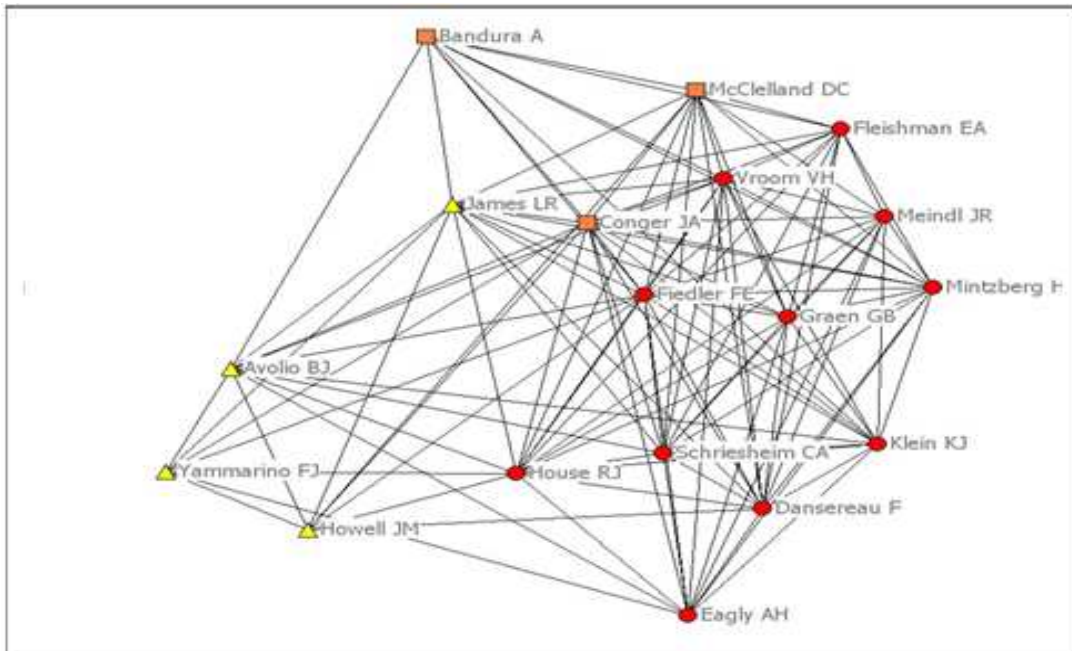|					
Bass BM	239	Podsakoff PM	73	Burns JM	40
House RJ	166	Dansereau F	63	Waldman DA	40
Conger JA	113	Judge TA	59	Gardner WL	39
Shamir B	106	Liden RC	59	Yammarino FJ	38
Lord RG	101	Howell JM	51	Meindl JR	37
Yukl G	91	Schriesheim CA	51	Sosik JJ	36
Graen GB	90	Pearce CL	47	James LR	34
Mumford MD	90	Klein KJ	46	Hogg MA	32
Avolio BJ	76	Zaccaro SJ	44	Day DV	31
Hunt JG	76	Lowe KB	43	Marion R	31

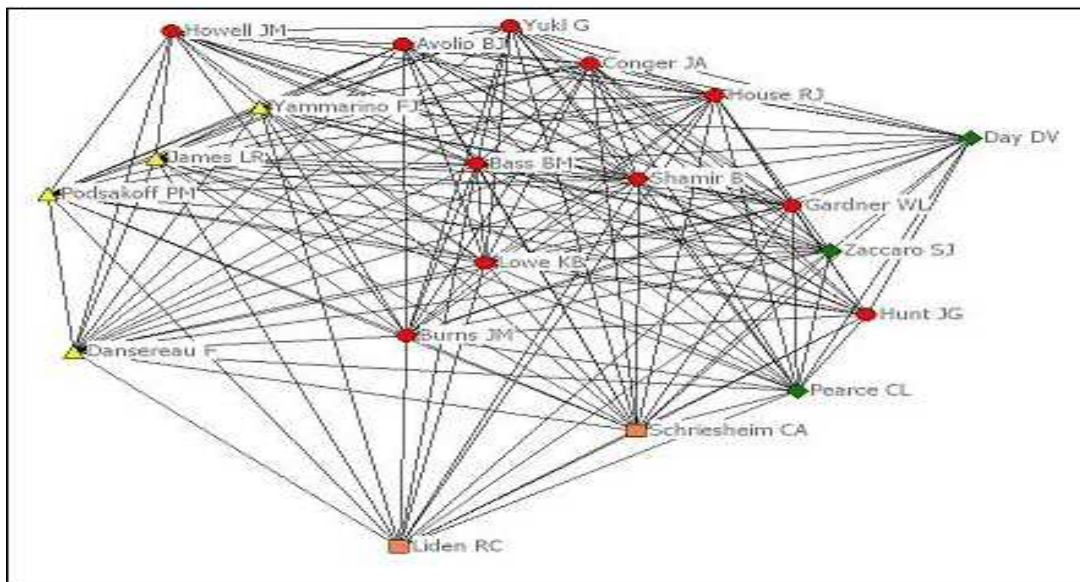Figure 1   Top Authors Co-citation Map from 2000 to 2004

Figure 2   Top Authors Co-citation Map from 2005 to 2009

The Status of Leadership Studies: Its Invisible Network of Knowledge

Factor Analysis of Authors

Following the example of previous studies (White, 1981; Culnan, 1986; Rowlands, 1999; Acedo, 2005), the researchers considered that a work should be included in a particular research trend when its loading is equal to or greater than 0.4. Moreover, if the loading is greater than 0.7, the work has made a considerable contribution to the corresponding paradigm. Tables 4 and 5 show the results of this analysis. Significantly, most of the authors' works are loaded with a weight greater than 0.7, demonstrating the relevance of these works within their respective paradigms. These works are of even greater interest, as they represent bridges between paradigms and allow us to observe a broader spectrum of influences among those works that belong to different research fronts, helping the researchers to understand the evolution and the ties that have been forming between the different research trends.

Based on the results of factor analysis, shown in Table 4, the researchers identified three factors, although some of them have a close mutual relationship. Factor 1 is related to the study of "LMX theory," where the researchers can include the works of Graen and Uhl-Bien (1995), Schriesheim, Castro, and Cogliser (1999), Dansereau (1975). Factor 2 represents the "Work motivation and individual differences" (such as McClelland, 1985; Bandura, 1986; Conger & Kanungo, 1987). Factor 3 focuses more on "Transformational and transactional leadership" (e.g. Yammarino, 1993; Avolio, 1999; Howell, 1993). There are several theoretical approaches to the study of leadership, but one well-known and contemporary framework is that of transformational/transactional leadership. Three factors noted in this paragraph accounted for 75.1% of the variance observed in the results.

In another factor analysis, presented in Table 5, the researchers identified four factors. The first group is related to the study of "Charismatic leadership," where the researchers can include the works of Conger and Kanungo (1998), Hunt, Boal, and Dodge (1999), Howell (1988), Shamir, House, and Arthur (1993). Factor 2 represents the "LMX theory" (e.g. Schriesheim, Castro, & Cogliser, 1999; Liden & Maslyn, 1998;. Graen & Uhl-Bien, 1995). Factor 3 includes the works of Dansereau et al., (1984), Podsakoff et al., (2003), Yammarino et al., (2005), etc., which investigate "Common method/source bias." Factor 4 represents the "Team leadership" (such as Day, Gronn, & Salas, 2004; Pearce & Conger, 2003; Zaccaro, 2001). While there are many different approaches to the study of leadership, in the present study, charismatic leadership styles will be investigated. The four factors listed in this paragraph accounted for 74.7% of the variance in the results.

DISCUSSIONS

The results of the factor and network analyses together yield many insights on the evolution of the leadership field. As revealed by our co-citation network analysis, leadership has gradually become an independent research field. In the following paragraphs, the researchers will briefly review the articles produced by the top authors to describe the activities in each stage.

Stage 1 For the period 2000-04, the researchers extract the following findings from Table 4 and Fig. 1. First, Graen and Uhl-Bien (1995) reviewed the literature on relationship-based approaches to the study of leadership, which has been termed "Vertical Dyad Linkage," "Leader-Member Exchange" and "Leadership-Making" over the past 25 years, although it is probably most easily recognized as the Leader-Member approach (1985). According to McClelland (1985), individuals who have a high need for power are also likely to rate highly with regard to activity inhibition in the Exchange (LMX) theory of leadership. Graen and Uhl-Bien (1995) presented a different three-dimensional conceptualization of LMX, focusing on loyalty, respect, and trust. Likewise, Schriesheim, Castro and Cogliser (1999) argued that six dimensions are predominant in the LMX research: mutual support, trust, liking, latitude, attention, and loyalty. Additionally, dyadic theories of leadership, including LMX theory, have focused on the vertical relationship that develops between a leader and follower (Dansereau, Graen, & Haga, 1975; Schriesheim et al., 1999). Dansereau et al's (1975) found that LMX is associated with outcomes such as the severity of job problems. In particular, Schriesheim et al. (1999) found that high-exchange relationships, characterized by high levels of mutual trust and reciprocity between superiors and subordinates, are related to higher levels of support for the leader, enhanced mutual communication, and higher subordinate commitment and performance. This perspective facilitates the integration of leadership theory with theories of interpersonal trust. The research on LMX can thus be leveraged to help scholars better understand how trust develops between leaders and their subordinates.

The Status of Leadership Studies: Its Invisible Network of Knowledge

Table 4

Top Authors' Factor Loadings at 0.40 or Higher from 2000 to 2004

Factor 1 LMX theory		Factor 2 Work motivation and individual differences		Factor 3 Transformational and transactional leadership	
Graen GB	0.91	McClelland DC	0.74	Yammarino FJ	0.90
Schriesheim CA	0.87	Bandura A	0.73	Avolio BJ	0.83
Dansereau F	0.86	Conger JA	0.70	Howell JM	0.80
Mintzberg H	0.81	Shamir B	0.69	James LR	0.73
Klein KJ	0.81	Bass BM	0.66	Lowe KB	0.65
Vroom VH	0.78	Podsakoff PM	0.60	Mumford MD	0.64
Meindl JR	0.78	Burns JM	0.60	Goleman D	0.58
Eagly AH	0.77				
House RJ	0.74				
Fiedler FE	0.73				
Fleishman EA	0.70				
Lord RG	0.67				
Kerr S	0.67				
Hunt JG	0.66				
Zaccaro SJ	0.63				
Eigenvalues	16.87		4.51		1.45
% Variance	55.5		14.8		4.8

Note: Extraction method, principal components analysis; rotation method, varimax.

Second, Conger and Kanungo (1998) argued that the outcomes of leadership can be assessed through followers' attitudes and behaviors at individual and aggregate levels. According to McClelland (1985), there are three needs that may differ between individuals, and these must be addressed by the work environment: achievement, power and affiliation. McClelland claims that individuals who have a high need for power and rate highly for activity inhibition should be more effective managers, especially if their need for power is greater than their need for affiliation. Similarly, Bandura (1986) suggested that self-efficacy is the source of an individual's behavioral

control, and also proposed that self-efficacy is influenced by antecedents such as vicarious information and enactive experiences. Other studies focused on the most widely known theories of transformational and charismatic leadership, namely ADD THE THEORIES HERE (Bass, 1985; Conger & Kanungo, 1987; Shamir, House, & Arthur, 1993).

Table 5

Top Authors' Factor Loadings at 0.40 or Higher from 2005 to 2009

Factor 1 Charismatic leadership		Factor 2 LMX theory		Factor 3 Source bias		Factor 4 Team leadership	
Conger JA	0.91	Schriesheim CA	0.94	Dansereau F	0.80	Day DV	0.82
Hunt JG	0.87	Liden RC	0.92	Podsakoff PM	0.72	Pearce CL	0.81
Howell JM	0.87	Graen GB	0.69	James LR	0.71	Zaccaro SJ	0.70
Shamir B	0.87			Yammarino FJ	0.71		
Yukl G	0.86			Waldman DA	0.68		
Gardner WL	0.86			Judge TA	0.65		
Avolio BJ	0.81			Sosik JJ	0.65		
Lowe KB	0.76			Klein KJ	0.65		
House RJ	0.76			Mumford MD	0.59		
Bass BM	0.75						
Burns JM	0.72						
Meindl JR	0.66						
Hogg MA	0.59						
Eigenvalues	14.05		4.53		2.16		1.94
% Variance	46.3		14.9		7.1		6.4

Note: Extraction method, principal components analysis; rotation method, varimax.

Third, Yammarino, Spangler, and Bass (1993) described transformational leaders as being able to motivate subordinates to do more than originally expected. Some of the characteristics of such leaders include charisma, individual consideration and the ability to stimulate subordinates intellectually. Specifically, Yammarino et al. (1993) found that transformational leadership qualities positively influence the appraised performance of Naval officers. Avolio, Bass, and Jung (1999) addressed some of the main criticisms of the Multi-factor Leadership Questionnaire (MLQ) survey, which is one of the

most widely used instruments to measure transformational and transactional leader behaviors in the organizational sciences. Finally, Howell and Avolio (1993) suggested that transformational leadership complements transactional leadership, and that effective leaders often supplement the latter with the former.

Stage 2 The researchers obtained the following findings from Table 5 and Fig. 2. First, Conger and Kanungo (1998) developed a questionnaire (the C–K Scale) based on their charismatic leadership theory. According to Howell (1988), there are two types of charisma: personalized and socialized. Personalized charisma, initiated for a leader's private motives, is used for the sake of the leader's own goals and personal advantage. Second, Liden and Maslyn (1998) proposed multiple dimensions of LMX that included both material and nonmaterial currencies of exchange, with these dimensions labeled Contribution, Affect, Loyalty, and Professional Respect. It is interesting to note that Liden and Maslyn (1998) suggested that any particular LMX relationship could be based on one, two, three, or all four of the dimensions. Third, According to Dansereau et al. (1984), data aggregation is appropriate when within-group variances are homogeneous but between-group variances are significantly different. Dansereau et al. (1984) also proposed using a data-analytic approach to specify and assess individual versus work-group effects in self and supervisor ratings, and they used Within and Between Analysis (WABA) to test the effects of multiple levels of analysis. Consideration of levels of analysis is first a theoretical issue (Yammarino, Dionne, Chun, & Dansereau, 2005), and members of a unit can be homogeneous within the unit or independent of it (Dansereau et al., 1984).

Finally, Day, Gronn, and Salas (2004) suggested that team leaders may be ideally positioned to enhance the team's own internal leadership capacity by helping the team develop its monitoring systems and learning from past events. Day et al. (2004) found that adaptability and mutual performance monitoring were necessary for effective team leadership. Team leadership has emerged as a significant element influencing team effectiveness in today's business environment, which require fast decision-making based on sometimes inaccurate, unavailable, or equivocal information (Pearce & Conger, 2003). They noted that while leadership scholars flirted with the notion of shared leadership and laid the theoretical foundation for it over the course of several decades, it was not until the late 1990s that the concept came to be viewed as a legitimate approach to understanding leadership and its consequences for organizations (cf. Fernandez, Cho, & Perry, 2010).

CONCLUSIONS

The past few decades have seen extensive research on leadership. This study investigates leadership research using citation and co-citation data published by LQ in the SSCI between 2000 and 2009. With the help of social network analysis tools and a factor analysis of the co-citation data, this

study maps the intellectual structure of leadership research, which suggests that current research is organized along different concentrations of interests: LMX theory, work motivation and individual differences, transformational and transactional leadership, charismatic leadership, common method/source bias, and team leadership. Future leadership studies will probably continue to center on these topics, with specific studies on charismatic leadership and LMX theory.

The research into leadership plays a significant role in the development of organization behavior and the management literature, and provides important guidelines for the management behavior in organizations. In order to understand the status of leadership research and the linkages between various trends in leadership studies, this paper provides a co-citation social network analysis to map the evolving patterns of the leadership field over a ten-year period. The current study contributes to the field by adopting the INK model to map the underlying structure of co-citations to reveal the relevant patterns of development. The researchers not only present the citation rankings for these ten years, but also analyze the links among the important scholars. Specifically, this study identifies the most popular and highly cited journal articles, books, and researchers in the field of leadership.

The results help to profile the invisible network of knowledge production in leadership, provide important insights and have implications on current and future research paradigms of leadership studies for management scholars and practitioners.

LIMITATION

This study only analyzed the journal *The Leadership Quarterly*, and thus the conclusions may be not represent all of the relevant styles and features of the leadership field over the period studied. Future researchers should thus seek to to broaden the scope of this study, in order to obtain more useful data.

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