

Are We Treating Networks Seriously? The Growth of Network Research in Public Administration & Public Policy

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The purpose of this research is to explore how the term ‘network’ is used in public administration and public policy. Since O’Toole (1997) first called for scholars of public administration and policy to “[treat] networks seriously,” a growing number of researchers use the term network as if it is a rising fashion trend. A recent article by Berry et al (2004) in *Public Administration Review* “Three Traditions of Network Research”, illustrates this trend. This article empirically examines the influence of a few prominent scholars on network research over the last decade. Subgroups of network research articles and authors in the citation network are also identified to illustrate the subtopics in network research and to probe what the term network means in these studies. The goal of this research is, in part, to answer Rethemeyer’s (2005) call for an empirical examination of network management. Secondly, this article aims to advance the understanding and use of methodology in the public administration discipline by showcasing the use of citation network analysis.

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INTRODUCTION

What does “network” mean in public administration and policy? What is network analysis in public management studies? We pose these questions as we are encountering an increasing use of the term ‘network’ in recent public administration and policy scholarship. In public administration and policy, some terms associated with network are particularly noticeable. One example is increased references to ‘policy networks.’ Recently, there have been a number of similar terms that have also been gaining more popularity, including ‘networked governance’, ‘collaborative network’, ‘inter-organizational network’, and ‘social capital/social network.’ It is clear that the use of the term network is decidedly on the increase both in general social science and public administration.

Arguably, the most evident scholarly work that made us turn our attention to networks is O’Toole’s paper published in 1997 calling for scholars of public administration and policy to “[treat] networks seriously.” Since then, a growing number of researchers use the term network as if it were a rising fashion trend. A recent article in *Public Administration Review*, “Three Traditions of Network Research” by Berry et al (2004) illustrates this trend well. Rethemeyer (2005) stated that the theoretical approach of ‘network management’ has matured and is now subject to empirical examination. In fact, the entire social science discipline is experiencing a rapid increase in the number of studies employing the term ‘network’ in one way or another (Borgatti and Foster, 2003). This article will empirically examine influential authors in the discipline and patterns of research streams with the expectation of finding clusters or subgroups of authors and research under network research.

This article examines the trends and development of network research in public administration and policy literature by employing citation network analysis. Although citation analysis (e.g., citation index, citation

network, co-citation network) can reproduce the history of the field, it is no substitute for extensive reading and in-depth content analysis. In that regard, we also supplement content analyses of abstracts and semantic network analysis for coded keywords as a complement to citation network analysis.

Background O’Toole’s seminal paper in 1997 called for treating networks seriously in public administration. He stated:

Networks are increasingly becoming important contexts for public administration and that networked settings are different in respects that matter for the conduct of administration. Public administration should attend to several types of network-focused research efforts. Some suggestions are: 1) Undertake systematic research to explore the descriptive questions on the network agenda. How much of managers’ time, effort, and contingencies lie in or are devoted to network contexts? 2) Shift units and/or levels of analysis to the network. 3) Address both conceptual and theoretical agendas by identifying dimensions of network structure that may help to explain and mediate program and service delivery results... (1997, p. 50).

O’Toole expressed the idea that treating networks seriously had not been ignored so much as it had simply not been a priority in the world of public administration. O’Toole added that both administrators and researchers have begun to devote efforts to understand and study this theme. His work has stimulated further work in the area.

Upon our review of the literature, we found that a few scholars in public administration posed the very same set of questions a decade ago. Bogason and Toonen (1988) discuss the meaning of the concept of ‘network’ in relation to other conceptual developments in public

administration such as neo-institutionalism and neo-managerial analysis. They state that it is easy to predict that networks (their interdependency patterns, ways of non-hierarchical governance and conflict resolution) would be more important in the future with the trend of decentralization and devolution of governments. They contend that there is more need to link networks to other theories such as game theory, resource dependence theory, and communicative/discourse theory. Toonen (1998) then presented a meta-theoretical framework to encompass networks, management and institutions in public administration. He contends that the network concept is useful but does not present a sound basis for re-founding the study of public administration. He asks us to deal with the challenge of integrating institutional, managerial, and network concepts in the study of public administration.

Milward and Provan (1998) stated that the majority of network studies in public administration had been used as conceptual schemes or metaphors. They called for advancing measurements to clarify these concepts, using rigorous analytic measures (Provan & Milward, 2001; Provan, Veazie, Staten, & Teufel-Shone, 2005). Borgatti (2006) argues that many theories are rooted in relational thinking and point us in the direction that some theories share common roots. Similarly, Wellman (1998) argued that a network is a perspective or worldview to perceive social problems and research questions, rather than just an analytic tools or metaphor.

Berry et al (2004, p. 549) identified three parallel streams of literature about network theory and research: social network analysis, policy change/political science networks, and public management networks. In so doing, they offered recommendations for advancing current scholarship on public management regarding network research, including providing a social network analysis tradition for those who focus on public management networks. They state that there has been an abundance of network research since O'Toole's seminal article in 1997 and

called for "a variety of methods for studying public management networks and cultivating discussion among those who employ different methods or whose work is guided by different theoretical orientations, including the value added by social network analysis. (p.549)"

At the advent of the ten-year anniversary of O'Toole's work, Robinson (2006, p. 589) claimed that the literature was clearly treating networks seriously. He stated that we are now past the need for demonstrations of the prevalence of networks and that it is now time to examine the origins, effects, and diversity of networks in public policy implementation and network governance. He suggests future research should investigate the diversity of networks, the relationships between the different types of collaborations and goes on to call for methodological pluralism and innovation to pursue this future research direction.

Rethemeyer and Hatmaker (2008) submit that there are four perspectives and two process models on networks and network management studies, but that there is no integration across them. They start with the common theme that "network management is unlike the management of hierarchies because it occurs outside the usual rational-legal basis for authority (p. 630)"

Their description of the four perspectives is:

- 1) Interest intermediation: in this school of thought the task of network management is reaching goal consensus, which restricts network management to the realm of policy networks.
- 2) Tools of government: to view network management as primarily a tool of implementation and collaboration while leaving aside the question of goal formation.
- 3) Focus on the information processing and knowledge management capabilities of networks.
- 4) Governance: taking seriously the idea that decision and implementation are not neatly divided (p.631).

They explain that the challenges of network research partly stem from the dual nature of any network: networks are both cause and effect. Therefore, some scholars focus on how managers can change 'action in network'; others focus on 'networks of action.' The two process models they describe are:

- 1) The Games-network approach.
- 2) POSDCORB (Planning, Organizing, Staffing, Directing, Coordinating, Reporting, and Budgeting) of the network era - four network management processes: activation/deactivation, synthesizing, framing, and mobilizing (Rethemeyer and Hatmaker 2008 p.632).

Rethemeyer (2005) also stated researchers should employ network measures and methods to theorize various network studies. Dowding (1995) critiqued policy network studies being metaphorical rather than theoretical. He argued:

Whilst we have learned much about the policy process by cataloguing the policy world into different types of network, the approach will not, alone, take us much further. Policy network analysis began as a metaphor, and may only become a theory by developing along the lines of sociological network analysis. In order to produce a network theory where the properties of the network rather than the properties of its members drives explanation, political science must utilize the sociological network tradition, borrowing and modifying its algebraic methods (pp. 136-137).

Hwang (2009) argues that the term 'network' means different things to different disciplines, this being related to the stages of network research in each discipline in terms of its maturity. He contends that network research grows idiosyncratically from metaphor to method, theory, and paradigm.

Hummon and Carley (1993) used citation network study for network research growth, particularly studying the citation pattern of SNA to gauge its advancement toward Kuhn's sense

of normal science. They examined the patterns in the citation network and found a high density of multiple citations, both to articles within a given journal and to key articles outside the journal, and many authors who have published more than a single article in the journal. They concluded that the overall citation pattern is consistent with a pattern of scientific development labeled by Kuhn as normal science. Basically, they looked at the evolution of citation networks over time and claimed that the field was moving to Kuhn's sense of normal science as citation network gets dense.

It is not a coincidence that different themes and theories in public administration, such as inter-organizational relations, neo-institutionalism, collaborative management and governance, share a common thread. Indeed, Bogason (2006) traces network analysis as developed in policy network literature in the 1970's, and discusses the status of network analysis in relation to the themes of public administration. He shows indirectly that groups of scholars over time have developed themes of network analysis in public administration under different names like inter-organizational relations, institutionalism, and governance.

The primary goal of this article is to continue this line of work by adding an empirical examination of network research studies through citation analysis. In doing so, we intend to identify or confirm influential scholars, their research and provide a visualization of the impact of scholarly research in this important and growing field. Our intention is not to function as a substitution for extensive reading and fine-grained content analysis such as Berry et al.'s (2004) work, but rather to confirm influential authors and demonstrate their impact on the citation network.

The premise of our study is in line with existing scholarship of citation studies, in which citations serve as a measure of the impact of that work (Garfield, 1992) and co-citation is used to map the intellectual structure of scientific disciplines (Bayer, Smart, & McLaughlin, 1990). Citation

analysis showcases highly cited scholarly manuscripts in order to measure their impact and track any emerging trends. The science citation index was proposed over fifty years ago and citation impact factors have recently begun to be treated as a proxy evaluation system for published articles (Garfield, 2006, 2007).

Whether citation impact factor accurately estimates citation frequencies and importance is controversial. Scholars in the information science domain have worked extensively in analyzing and visualizing citation index data (Chen, 2006; Garfield, 1992; Rousseau & Zuccala, 2004; Schwartz & Fang, 2007; Small, 1999; White & McCain, 1998). Scholars in the network analysis domain have also contributed heavily to analyzing citation patterns and co-author collaboration (Batagelj & Mrvar, 2008; Lazer, Mergel, & Friedman, 2009; Leydesdorff, 2007; White, Wellman, & Nazer, 2004). It has become abundantly apparent that examining citation data can greatly augment our understanding of how a given study domain has progressed. As a professional norm, scholars pay tribute to the existing body of knowledge by citing them. We believe studying citation patterns using citation network analysis is a good measure of the impact of scholarly research

Certainly, citation analysis and citation network analysis have limitations and biases. Yet, we contend it is worthwhile introducing them to the readers of public administration studies because all of the public administration journals in the Social Science Citation Index (SSCI) advertise journals' impact factors as journals' authority-building and marketing. Also, peer reviewed articles are considered a very important part of scholarly achievement for tenure review, at least in the U.S. Thus, we believe citation analysis and citation network analysis have some values. We also believe citation network analysis has not been utilized in public administration scholarship so far, which makes this study useful.

Research Questions

In undertaking this research, we set out to examine three related research questions:

- RQ1: What is the impact of O'Toole's work?
- RQ2: What is the current status of network research in public administration and policy?
- RQ3: What are the sub-topics in network research in public administration and policy?

METHODS

Data

Data for this research were acquired from the Social Science Citation Index (SSCI), ISI Web of Science. Publications were drawn from all journals in the SSCI that were published within the subject category of public administration. Publication dates were limited to the past decade. Such data allows for an empirical assessment of how the term network has been employed in research articles within the fields of public administration and public policy. There is no Public Policy classification but the Public Administration subject does include journals of Public Policy, including JPAM (Journal of Policy Analysis and Management). There were 26 journals in this category. In February 2007, we did a search for the term 'network' in 26 public administration journals on SSCI, in the fields of 'abstract', 'keyword', and 'title'. This search returned 257 articles. Web interface is not particularly useful in data mining. We saved the data as xml and endnote format files but ultimately transformed into xml, with which we were able to extract information by computer programming so that the data is suitable for network analysis. Additionally, it should be noted that this citation network is limited to the 257 articles that were identified through the SSCI. We recognize that it is possible that articles that may be related to the subject, but do not have 'network' as a keyword may have been

excluded. That is, we may have inadvertently excluded other journals.

As briefly stated before, using SSCI data has limitations and biases. It reflects much of the scholarship in the U.S. but not scholarship globally. The chosen language is English; thus the data excludes other foreign language publications. Moreover, we know there is a tradition that many European scholars, unlike scholars in the U.S., publish their research in books, reports, and journals that are not in SSCI. Thus, this data does not present us with a whole picture. However, we argue that it is still meaningful because this data shows us the picture of scholarship in the U.S. and will provide a good starting point to expand in the future.

Co-Citation Networks

Social Network Analysis (SNA, network analysis) was employed using the software package, ORA (2009). Network analysis provides a description of citation patterns. The structure of citation patterns (citing, and cited) among scholarly works that involve network research were examined in this way to identify structures in social systems on the basis of the relations among the system's components rather than the attributes of individual cases (Wasserman & Faust, 1994). Using the 257 articles that were identified using the SSCI, we constructed a list of authors and a corresponding list of journals where their articles were published. Next, the citation relationships between authors and journals were determined. Resulting article-to-article node-sets display their own citation networks. For example, if *Article A* cites *Article B*, then the authors of *Article A* are citing those of *Article B*. In this procedure, each author of *Article A* has citation links to all of the authors of *Article B*. To discover the journal-to-journal citation relationships, we created a link from *Journal A* to *Journal B* if *Article A* was published in *Journal A* and *Article B* in *Journal B*. The direction of the citation links was determined as originating from a cited article, author, and

journal and directed towards citing entities. While article-to-article citations offer no intuitive method for weighting links, author-to-author citations and journal-to-journal citations can be weighted according to citation frequency. This is because an author, or a journal, may cite a number of articles written by the same author, or journal.

Entities were clustered in accordance with the Newman-Girvan (Newman 2004) grouping algorithm which identifies clusters by disconnecting high edge-betweenness links and creating components from the disconnections. Lastly, we added a semantic network analysis (using Automap) and a complementary qualitative analysis. We coded keywords from titles, keywords, and abstracts of the 257 articles to use the frequency as a corroborating technique to the citation network analysis (using Atlas Ti). Semantic network displays the distance and grouping of the keywords in addition to their frequencies.

RESULTS

As discussed earlier, scholars in network science have already documented the rapid increase of network research in social science and beyond (Borgatti & Foster, 2003; Freeman, 2004, 2008). Over the past years, we have witnessed an increase in the use of network analysis in scholarly research in the field of public administration and policy, but the volume of network research in other fields is similarly expanding and well worth noting. When our search for the term network was conducted in SSCI, the management subject returned 314 articles in 2007, up from 115 in 1992; information science increased to 134 from 62; sociology increased to 98 from 33; economics increased to 167 from 45, and political science increased to 62 from 13.

A search of the SSCI from 1992-2007 on the frequency of published articles by author in SSCI shows that (Table 1) Klijin published the most articles (9), followed by Provan (6).

Table 1. Frequency of Publications by Author During 1992-2007 (Minimum Count Of 2)

No/Rank	Author	Frequency
1	KLIJN, EH	8
2	PROVAN, KG	6
3	CONSIDINE, M	4
3	MEIER, KJ	4
3	O'TOOLE, LJ	4
6	HARMAN, R	3
6	LEWIS, JM	3
6	SKELCHER, C	3
7	14 other authors	2

Table 2. Top 10 Central Authors: Centrality of authors in the citation network (OutDegree: Cited by Others)

No/Rank	Node Title (Author)	Centrality / Author-To-Author
1	O'Toole	0.2205
2	Klijn	0.0816
2	Meier	0.0816
4	Milward	0.0574
5	Provan	0.0544
6	McGuire	0.0453
7	Agranoff	0.0393
8	Borzal	0.0272
9	Bogason	0.0211
9	Toonen	0.0211

An initial scan of the data shows O'Toole's 1997 article as the most cited work and O'Toole as an influential scholar in this network of policy and administrative network research (see table 2 & 3).

Table 3. Top 17 Central Papers: Centrality of Papers in the Citation Network (OutDegree: Cited by Others)

No/ Rank	Node Title (Paper)	Centrality / Paper-to-Paper
1	O'Toole, 1997(b)	0.1484
2	Meier, O'Toole, 2001	0.0352
3	Klijn, 1996	0.0352
4	Provan, Milward, 2001	0.0313
5	Agranoff, McGuire, 2001(a)	0.0273
6	Meier, O'Toole, 2003	0.0234
7	Borzal, 1998	0.0234
8	Bogason, Toonen, 1998	0.0195
9	Lowndes, Skelcher, 1998	0.0156
10	Blom-Hansen, 1997	0.0156

Figure 1. Article-to-Article Citation Network 1992-2007

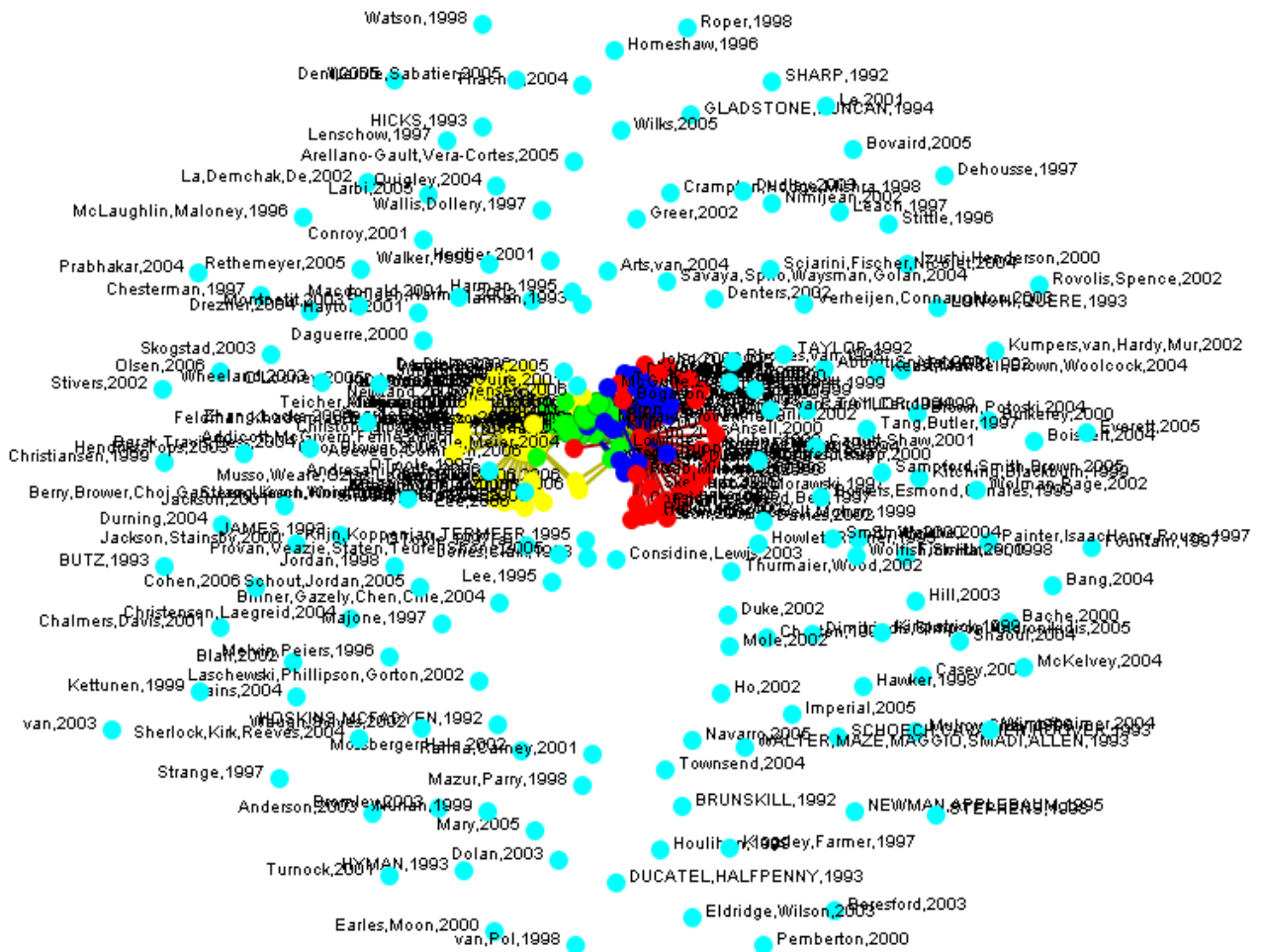


Figure 1 shows the metamatrix of article-to-articles citation networks.

Figure 1 and 2 display the entire network of article-to-article citations. A sizable number of isolates are apparent in addition to a densely connected citation network consisting of four subgroups. This pattern suggests that we may be experiencing a paradigm shift (Kuhn, 1970)

within the field. According to Hummon and Carley (1993)'s reasoning, a dense citation network represents a matured domain or school of thought, which can be interpreted as a normal science paradigm.

Figure 2. Paper-to-Paper Citation Network 1992-2007

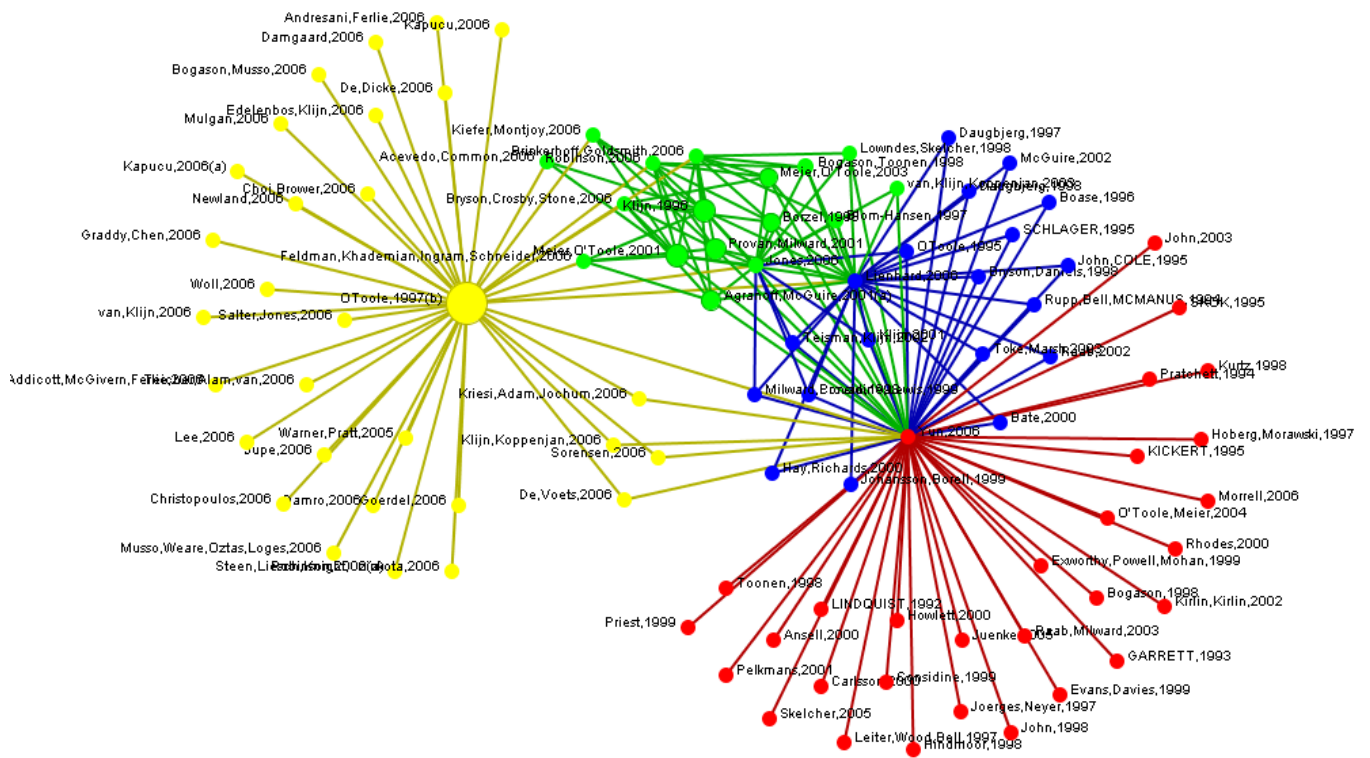


Figure 2 shows the metamatrix of citation network after excluding isolates.

Figure 2 displays the article-to-article citation network after excluding isolates. With Newman-Girvan grouping, there are four subgroups. One group is clustered around O’Toole’s 1997 work. Another group is clustered around the works of Provan, Milward, Agranoff and McGuire. The other two subgroups do not show a node with strong centrality and we cannot point out major works in those subgroups. Although we would need to thoroughly examine these articles in order to formally categorize them, these findings appear to corroborate Rethemeyer and Hatmaker’s suggestion that there are policy networks and collaborative networks. The presence of two groups of collaborative

networks/management also seems to agree with their two process models.

Klijin’s works are best known for studying policy networks. This partially explains the gap between frequency and centrality analyzed here. As we stated, therefore, we decided to look at the keywords to further our inquiry. As a complementary approach, qualitative coding to extract keywords and semantic network analysis was conducted. We read titles, keywords, and abstracts of 217 articles to investigate development trends and key topics.

Table 4 displays the results of key word frequencies that were generated through qualitative coding analysis. Not surprisingly, ‘policy network’ appeared most. The term ‘governance’ appeared equally often, reflecting the shift to the governance paradigm in public administration literature. ‘Partnership’ and ‘collaboration’ were next. ‘Emergency management’ appeared frequently as well. Policy network has a long history in the policy study domain. As discussed earlier, many studies use the term ‘network’ metaphorically. We believe this contributed to the high frequency in this table. Scholars studying governance and collaboration see the importance and merit of using networks in studying a new governance paradigm where public administrators work across the sectors and judicial boundaries.

Figure 3 illustrates the semantic network that was generated using Automap. Management, performance, governance, and collaboration were the keywords with the highest centrality¹. The figure shows a group of keywords with governance, partnership, and collaboration. This, we believe, represents a group of scholars studying collaborative governance, inter-sectoral collaboration, and inter-organizational partnership. Another grouping was management, performance, local government, contracting, network-management, and network-structure. This group, we believe, represents scholars interested in looking at the performance and effectiveness of management through the lens of network. Another grouping was policy-network, policy-change, policy-making, and trust. This group represents long-standing policy network related studies. The proximity of themes of studies to each other is clear. Together, Table 4 and Figure 3 illustrate subgroups of scholarly works within the network research discussed above.

Table 4. Qualitative Coding Analysis: Keywords Frequencies

CODES	Frequency
Policy network	31
Governance	31
Partnership	12
Collaboration	9
Innovation	8
Emergency management	8
Institutions	7
Policy implementation	7
Health policy	7
Social welfare	7
Leadership	5
Contracting	5
Policy change	5
Homeland security/terror	5
Democratization/democracy	5
Stakeholder analysis	5
Organizational learn	4
Decision-making proc	4
Information technology	4
Managerial networking	3
Knowledge diffusion	3
Public sector reform	3
Social capital	2

¹ Centrality is a concept and measure in social network analysis. Simply put, it is a measure of an importance of a node in a network.

Figure 3. Consolidated Semantic Network

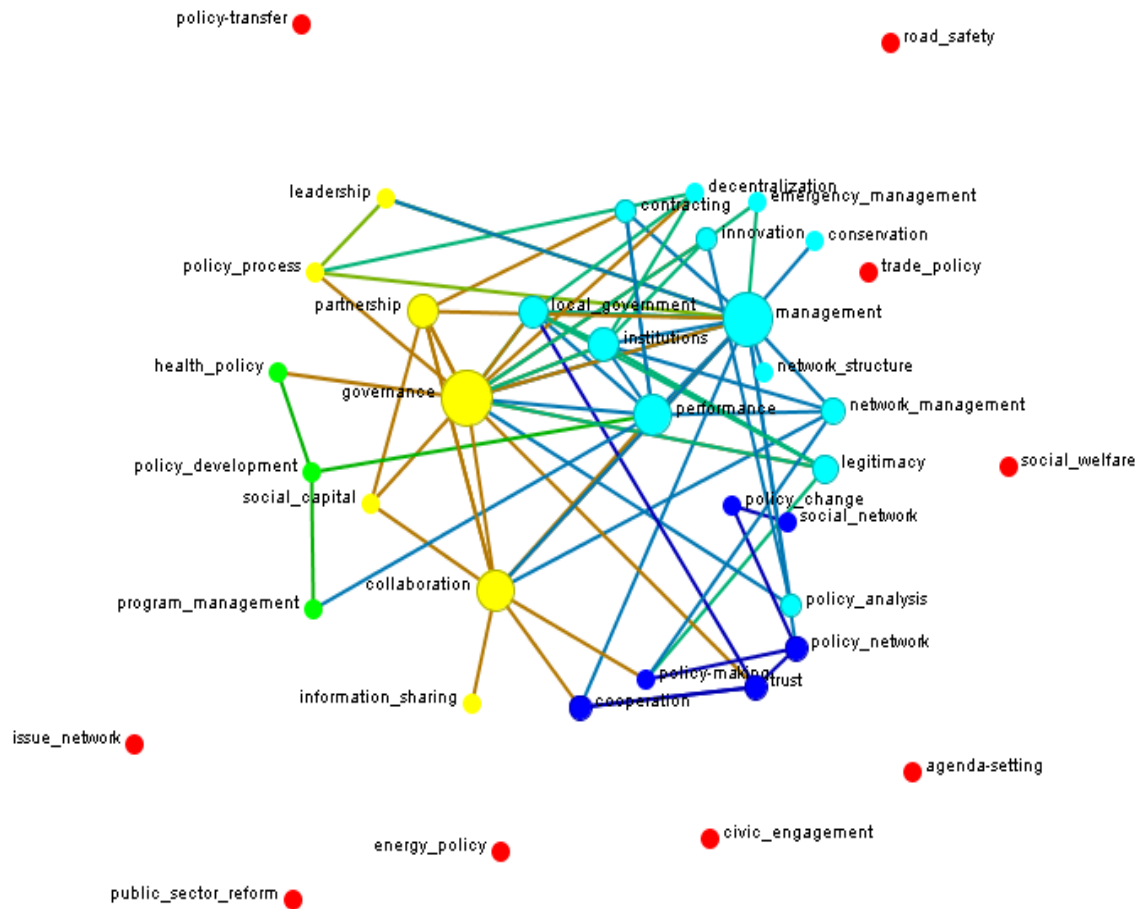


Figure 3 shows the semantic network of keywords that appear in the articles.

DISCUSSION & CONCLUSIONS

We believe that the above analyses offer an empirical confirmation of O’Toole’s impact on network research in public administration and policy. Increased cross-citation over time (citation network maps over time) and a variety of keywords show that network research is growing rapidly. Subgroups of citation networks visually and empirically illustrate the work of Berry et al. (2004) and Rethemeyer and

Hatmaker (2008) in demonstrating that there are different perspectives among network research in public administration and policy. Overall, the analysis of network results captured some of the many different perspectives and traditions now incorporated as part of network research. We recommend further qualitative analyses to investigate the nature of those differences and investigate how each subgroup is using network measures.

Citation patterns for the entire network do not seem to be dense enough to constitute Kuhn's sense of normal science according to Hummon and Carley's (1993) definition, but the network appears to be progressing in that direction. It seems that the public administration discipline is at the beginning of a growth stage in network research. It is therefore imperative that we revisit this issue in the future.

In conclusion, we echo Rethemeyer's call for an empirical examination of the network approach in public management, particularly given the increase in the number of works discussing collaborative public management, collaborative governance, networked governance, and other similar themes. We also concur with Dowding in his critique of the contemporary use of the network approach as being too metaphorical. So far, the majority of network research seen in public administration is metaphorical or conceptual. Our claim is that until now, it has been appropriate to examine networks conceptually. We believe conceptual studies have contributed to the field in advancing the call for more empirical works. However, we argue that we are at a critical juncture as we need to move beyond the conceptual or metaphorical use of "network", particularly after a decade of network research growth. In other words, we believe that metaphorical usage could advance to development of methods and theories.

What is network research? Are we seeing the development of integrated network theory in public administration? A single definitive answer may not be possible or even desirable. But we believe that there is value and utility in searching for it, perhaps generating multiple sets of well-defined theories particularly suitable for various sub-domains such as policy networks or collaborative management. In doing so, we would improve sets of analytic tools, measures, and data collection instruments that are suited to public administration and policy.

So, are we treating networks seriously? We would like to provide two provisional answers here. Yes, there has been a great increase of

network research answering O'Toole's call to treat network seriously. And no, there is not enough serious network research and, in that it is time for us to move beyond the metaphorical use of network in public administration research, we need more. There is a need for more empirical works on network research, particularly employing rigorous network analysis approaches. We should advance the measures of network research, both adopting and developing dyadic measures and analytic tools such as blockmodeling and logistic network regressions (e.g.: Quadratic Assignment Procedure). We also need to establish a solid body of network data collection instruments (survey instruments, interview protocols, etc). With few exceptions, including Provan and Milward's works, tested and reliable data collection instruments embedded in public administration and policy do not exist at this stage. With these advances, we can move toward building an integrated and comprehensive network theory in public administration. One notable exception in addressing methods, including challenges to measures (and collect) data, is the recent book edited by (Bogason & Zølner, 2007). They illustrate why we need to discuss methodology in studying network governance and discuss challenges and approaches in collecting data and developing empirical methods.

The data we extracted from SSCI has limitations. We know that the data on which we have focused may not have precisely captured influential works by particular scholars, such as Provan and Milward, in both the public administration field and the management science domain. This investigation should also be expanded into other journals and subjects in order to investigate the interdisciplinary citation patterns to detect influential works from outside of public administration to the network research in public administration. The data is also somewhat U.S. scholarship-oriented, as European scholars publish beyond these journals in SSCI more than U.S. scholars. Yet, we believe it captures public administration in the U.S. well as well as some influential scholars from Europe, and it sets a stage for future

research. We call for expanding this analysis, possibly incorporating Google scholar and other databases to collect data that we were unable to get with SSCI.

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