

## **Measuring 16 Years' Evolution of a Collaborative Water Planning Network**

### Comments

I believe the paper aims to determine the main feature/s – structural characteristics - of the “meeting participation network” (as authors call it) relating to a successful hydropower licensing, and how the feature/s evolve over time. But the paper is not specific about its goal. The goal appears to be very general. It says “this paper observed the evolution of the governance network involved in a highly collaborative process for licensing a hydropower dam in Washington State.”

Since evolutionary feature of a mandated network is not well understood, this paper has potential for contribution. For example, what are the key organizing principles of such networks and how those principles change or do not change over time are less understood. Another good thing about the paper is that it uses meeting minutes to generate network data instead of conventional (and subjective) survey-based instrument.

However, the paper has significant issues. In addition to convoluted presentation, the research is not set in the larger context, the theories and hypotheses are poorly developed, and the measurement of variables and discussion of results are problematic.

I have organized my comments by headings of the paper.

### Title

The authors may want to pick a better title. The current title “..... water planning network” does not appear to capture the intent and context of the study.

### Abstract

The abstract is difficult to comprehend. The authors should get away with network jargons (e.g. networks over their full lifecycle, grassroots network, etc.), and simplify the construction with a focus on the main message.

### Introduction

The study is not set in the larger context. What is the larger issue in terms of literature and of practice (the regulatory arena, in this case)? For example, if the case under study is a highly successful collaborative network (as claimed), what are the interesting research questions for theory and for practice?

The research question is very general. The authors should come up with specific research questions. One way to handle this perhaps would be to review the hypotheses and construct

research questions around those hypotheses so that the readers know upfront what the paper is up to. Regarding the “evolution of network,” the author should be clear that when they mean by it. Is it evolution from one form of network governance (e.g. mandated) to another form of governance (e.g. participant-driven)? Or is it evolution of network relationship within a form of network governance (e.g. mandated network)? Or both? A review of JPART article by Provan and Kenis might be helpful to clarify the distinction.

The paper does not review the literature. It should discuss what we already know in the field, and how this study advances the knowledge. In other words, why one should care about this study? The paper is almost silent in this regard.

There are a lot of unexplained terms or network jargons; they need to be either defined or replaced with terms that are self-explanatory. For example, in the first few pages there are terms like network governance, governance networks, governance structures, lifecycle of governance networks, fine-grained interactions, aggregated summaries, partially mandated network, similar trajectories as organic ones. This is true for throughout the manuscript. Also, be consistent in using the terms throughout the manuscript. For example, are network governance, governance networks, and governance structures same or different? Clarify them, and use consistently.

I should also note that there are statements that are difficult to understand. For example, “We find that the mandated networks are remarkably stable over 17 years, with few changes in who occupied central nodes and with active participations more likely to sustain their engagement over time.” The authors should provide the context or simplify the construction or both to get the message across. By the way, this is also an issue throughout the paper.

#### Case background: Baker River hydropower relicensing

Provide detail description of the case. What is the goal of this mandated network for the hydropower relicensing? Who are the participants (nodes)? What is the nature of participation (mandated or voluntary)? What issues the participants face to achieve the goal? How ties are initiated or created? What are the “contents” of ties? How those ties emerge into networks?

The paper mentions that the relicensing process involves several phases. It is pertinent to discuss what each phase involves, which organizations are involved, and why and how network of ties emerge. Make it clear how you are studying evolution of networks: Are you studying evolution across time, or all phases or both? If not all phases, which phases and why? Rather than attempting all or everything, you could ask what would be theoretically interesting and important. This part is also not clear in your discussion of the research design and interpretation of the results.

Also, make clear upfront whether your study focuses on “dyadic” ties (who is connected to who), or on “extra-dyadic” ties (structure of ties).

## Theoretical framing and hypotheses

Your first two paragraphs relate to your research questions. You should communicate these questions upfront in the introduction section with a greater clarification.

Part of the third paragraph is a good candidate for discussion in the Case Background section.

This section will require a lot of work to make it logically coherent and convincing. There are conceptual as well as organizational issues.

Regarding the concept, I would add one or two paragraphs clearly explaining how “participation network” comes into existence. Granted, it is mandated. But that does not automatically lead to creation of “ties.” What problems these participants are trying to solve, and, in turn, lead them to connect or make ties? Do participants have different interests and motivations? How many types of ties (“actions” as you say)? And, why one would expect different network structures, and different patterns across different phases that you claim in your hypotheses?

Theories preceding each one of the hypotheses are underdeveloped. Discuss in detail the conditions and the behavioral response of the participants that would lead to the network configurations that you claim to hold. Contextualize the discussion by providing pertinent examples. Bring in references from past works that discuss similar conditions to make your argument credible.

The construction of the hypotheses is complex and difficult to follow. Reorganizing them can improve simplicity and coherence. For example, instead of lumping “utility authority” and “organizations with mandatory conditioning authority” together, one can have separate hypothesis for each, H1a for utility and H1b for organizations with mandatory conditioning authority. I guess the motivation and conditions are different for them. Then, I think, one can combine new H1a and H5, where you have a separate hypothesis for utility. By the way, the authors should clarify the term “utility.” It is throughout the paper, and is confusing. Why not say, for example, the “convenor or lead organization” (if you don’t want to mention the name of the hydropower utility)?

Another related issue is that the network terms used in the hypotheses such as “occupy more central nodes and service in leadership positions more regularly than other organizations” in H1 are not clearly defined in the discussion preceding the hypothesis. What does “more central nodes” mean? Is it the number of organizations contact contacted by an actor? Or, is it the number of ties? One should be aware that a pair of organizations (nodes) can have multiple ties. One should also be explicit about whether it is simple number of counts (degrees) or the distribution of the number of contacts (a degree centralization concept). Other hypotheses too require such clarification. For example, what does “drop off” in H2 mean, and how is it represented in network term to be able to observe and test? The same issue applies to “peripheral attendees.”

Why not combine H2 and H2a? H2a simply emphasizes attributes (less resources and less technical expertise) of the same peripheral actors mentioned in H1.

Likewise, H3 and H4 can be combined. Isn't the intent here to evaluate the network patterns before implementation phase and during the implementation phase? Here too, it is not clear what "network patterns" mean, and how they are going to be observed.

### Analytical framework

I would begin this section with data collection, and move Data and Field Methods into this section. A couple of issues here. Provide a clear discussion of each step you took from collecting meeting minutes to arrive to a "tie" between a pair of participants in the meeting. I guess you treated each "action" from a participant as a tie. How many types of actions did you consider? What are those "actions"? Listing those actions are important because I presume each action resulted in ties between pairs of participants. If so, I assume there would be multiple ties (because of multiple actions) between the same pair of actors. I also guess that, for each action (and for that matter, each meeting), there were different numbers of participants. So, how did you address the overlap of actors and the overlap of actions (ties) to arrive at the final network for analysis? How did you address the differences in the overlap of ties and actors? And, what is the size of the network? Is the final network dichotomous or a valued network?

You mentioned that you created 32 semi-yearly networks. Why not yearly, for example? What is the theoretical justification? Do you think the results will prevail if you do create yearly or quarterly networks?

Like above, discuss in detail how you arrived at networks for each phase of relicensing. This is unclear.

In p. 29, you discuss the potential bias resulting from machine coding. Large part of the technical discussion can go into the footnote. In the text, you should focus on what you did to check the bias and possible implications of the bias, if present, for the results.

After data collection, I would discuss the model. Here, briefly discuss why TERGMs, what it does, and how dependent and independent variables are conceived in this model. Avoid technical discussion in the text. The technical discussion can go into the footnote or in the appendix. Discussion of data prior to the model can also help avoid duplication of discussion you have about data in the model section.

### Explanatory variables

For each variable, the authors should provide an unambiguous description of the measure, how it is operationalized, the basic descriptive, and how positive or negative estimate for the measure should be understood. Simplify the description. The description is vague and difficult to follow.

For example, for H1 related measure, you define outgoing edges as "the number of times a designated node (in this case, one with mandatory authority) interacts with another stakeholder." This can be understood as multiple ties from one actor to another actor. I think you intend to

measure the actors' number of stakeholder partners (or the actor's network size), which is different from multiple ties between a pair of actors. Your description of representing "organizations with mandated authority" is also confusing. It is not enough to say "categorical attribute." Tell whether it is binary (0, 1), and how it is coded. Finally, provide basic descriptive of the measure, and tell what a positive or a negative estimate would mean in terms of the mandated authorities' centrality in the network.

Likewise, for H2 related measure, define "peripheral actors in networks" in simple term, define eigenvector strategy (centrality?), why eigenvector centrality is preferred over simple measure of degree centrality, and what positive or negative coefficient for the measure would mean.

Other measures have similar issues. It is not clear to me what is the measure for H2A, and "three types" and "two types" of actors are totally confusing. What do you mean by "memory term"? How did you operationalize this? How did you operationalize "process phase"? Further, if your H1 anticipated changes in ties (dynamics) across time and phases, why do you test stability across phases in H3? It appears contradictory. I have similar issues with the measure related to H4. In addition, aren't dyad stability and edge (tie) stability the same? How did you operationalize time covariate?

Simplify the table, and add direction of the expected relationship to make it more meaningful.

## Control variables

Provide rational for controlling for internal (endogenous) tendency for actors to create certain configuration of ties. The discussion of control variables is overly complex. Avoid network jargons and simplify the presentation.

## Results and discussion

My first reaction is why the authors estimated separate models for each hypothesis. Why not to have one model estimation? Second, why you have so many figures? What additional information do these figures provide that is not provided by the tabular results? If the figure improves interpretation, then you can have one figure where you get rid of controls and include only variables of interest.

The discussions in these sections are convoluted. I would simplify and reorganize them. Avoid introducing undefined new terms; and, there are many such terms like "cubic time trend...." (p. 32), "polynomial time trend" (p. 33), "endogenous structural terms" (p.33), for example. Also, avoid unnecessary statements like "As one of the first quantitative longitudinal studies....." (p. 43). The authors should focus on the estimated results, and explain how and why the results support or do not support their hypotheses. For results that are contrary to the expectation, the authors should take more time to provide explanation.

Avoid overinterpretation. In many instances, the interpretation does not make sense, or results are simply misinterpreted. For example, the authors conclude that “Thus, both terms indicate that representatives of utility and mandatory authority organizations occupy more central leadership roles in group meetings” contrary to the result for the mandatory organizations in Table B1. The coefficient for mandatory (sender) is not statistically significant. There are several other instances in the text.

In the discussion section, the authors should also discuss the theoretical and practical implications of their findings. I was sort of surprised that the authors did not highlight the importance of stability of the utility authority (the lead organization) in the network. I thought that was significant finding especially in a mandated network where a lead organization like the utility authority takes the lead in organizing and sustaining the network. This is what Provan and Kenis suggested in their JPART article (in the authors’ reference list). They proposed that “Specifically, when governance becomes established as either a lead organization or NAO form, evolution to shared governance is unlikely. Both lead organization and NAO forms are more stable, less flexible forms, with institutionalized leadership roles that make it difficult to shift to shared governance. ....Thus, evolution is much more likely to move from a lead organization form to an NAO, than from lead organization to shared governance” (p.247).

While it is up to the authors, but it seems to me that the authors could use the proposition advanced by Provan and Kenis as a basis for their research question.

## Conclusion

The authors should also talk about the limitations of the study, and future directions or sort of what next.

Hope this helps.