What policy diffusion research can learn from social network analysis (and vice versa)

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Abstract

The paper argues that policy diffusion research and network analysis can exchange theoretical and methodological ideas to mutual benefit. Both strands of research have henceforth proceeded in separate lines. This is surprising, as the fundamental theoretical tenet is the same – to explain the behavior of actors with reference to their position in a social structure. Having recognized this common ground, policy diffusion research can profit from network analysis in several ways. First, social network analysis re-directs our attention to the actors that drive policy diffusion. Second, theoretical ideas from social network analysis can help to conceptualize the role of power in diffusion processes. Third, the distinction between structural and relational approaches to networks helps to make policy diffusion theories more specific. Fourth, network visualization techniques can complement the regression techniques used by policy diffusion research and give additional analytical leverage over the data. Conversely, network analysis can profit from policy diffusion research. First, policy diffusion research is an empirical application that demonstrates that social networks matter, thereby countering the claim that network analysis is “butterfly collecting”. Second, policy diffusion research additionally can elucidate which of the many conceivable social networks matter for policy change. Third, policy diffusion research is by definition a dynamic application, thereby countering the claim that social network analysis is overly static. Thus, both strands of research can profit from more attention to the other. The paper illustrates the added value of the theoretical cross-fertilization by re-interpreting classical findings of policy diffusion research in social network terms.
Introduction

Policy diffusion has recently attracted considerable scholarly interest in political science. The fundamental idea is that governments’ policy choices are not only conditioned by domestic or „top down“ international factors, but are highly contingent on policy choices made by other governments that are geographically or socially near to them. The empirical contribution of diffusion theories to comparative policy research is considerable. Political phenomena like the diffusion of liberal economic policies (Simmons and Elkins, 2004), the privatization of infrastructures (Henisz et al., 2005), the emergence of „regulatory capitalism“ (Levi-Faur, 2005), the spread of electoral systems (Massicotte and Blais, 1997), tax policies (Swank, 2006), or bilateral investment treaties (Elkins et al., 2006), can be explained better referring to the interdependence of governments in their decision-making. The theoretical contribution promises to be equally important, as a new class of horizontal mechanisms of policy change complements the established bottom-up and top-down mechanisms (Levi-Faur, 2005).

Scholars familiar with social network analysis will immediately recognize the parallel research agendas and the common theoretical foundation. Both lines of research share the assumption that the embeddedness of actors in social relations matters for their behavior (Wellman, 1988a, Elkins and Simmons, 2005). But the common theoretical foundations are only seldom made explicit. Most diffusion studies do not make reference to network analysis, and do not apply network analytical tools.

This paper argues that both lines of research can profit from each others theories, methods and results. Diffusion research and network analysis have considerable theoretical and methodological intersections, but also important differences. In many important theoretical and methodological questions, both strands of research are complementary, and can compensate each others weaknesses.

Current policy diffusion research can obtain better theoretical leverage and research tools
using the insights of social network analysis. First, social network analysis can re-orient the focus of policy diffusion research to the role of actors. Second, social network theories about positively and negatively connected networks help to conceptualize the role of power in diffusion processes. Third, the concept of structural and relational approaches to networks helps to make policy diffusion theories more nuanced. Fourth, network visualization techniques can complement the regression techniques used by policy diffusion research and give additional analytical leverage.

Conversely, social network analysis can benefit from the ideas and results of policy diffusion research. First, policy diffusion research is an empirical application that demonstrates that social networks matter, thereby countering the claim that network analysis is “butterfly collecting”. Second, policy diffusion research additionally can elucidate which of the many conceivable social networks matter for policy change, and test network explanations against competing attributional explanations. Third, policy diffusion research is by definition a dynamic application, thereby countering the claim that social network analysis is overly static.

To illustrate the argument, several current studies of policy diffusion are re-interpreted in network terms. In a meta-analysis, they are analyzed with regard to the networks they postulate, and the networks they identify as causally important. The result is that current policy diffusion studies support a view of an international system in which networks matter. The studies support cohesion as well as structural equivalence arguments. The international system is structured by abstract roles and competition, as well as by direct links and information exchange. Thus, policy diffusion research can be seen as empirical support for the paramount role of networks in structuring the international system.

The paper is structured as follows. The second section discusses the commonalities and differences of diffusion research and social network analysis. The third section outlines how diffusion research can profit from network analysis. The fourth section outlines how network analysis can vice versa profit from diffusion research. The fifth section comprises an empirical illustration of the theoretical arguments, and shows how current diffusion studies empirically
The relationship between diffusion research and network analysis

Policy diffusion research and network analysis share considerable similarities in theory and methodology. For the field of organization research, Borgatti and Foster (2003) consider diffusion research to be a distinct subfield of network analysis. While one might quarrel with this classification – one might as well consider networked diffusion to be a subfield of diffusion research (Valente, 1999) – it highlights the fact that both approaches share theoretical assumptions and methodological approaches.

However, policy diffusion research (Simmons and Elkins, 2004, Braun and Gilardi, 2006), has not utilized the established theoretical and methodological ideas of social network analysis. But studies of policy diffusion can profit from recasting their research questions in network analytical terms. Policy diffusion studies often implicitly use theoretical concepts of network analysis, and network data, without realizing the full potential these theories and data offer.

Thus, this section will discuss the underlying theoretical similarities, as well as the special features that distinguish policy diffusion research from mainstream network analysis. The aim is to lay the foundation for elucidating the potential for theoretical cross-fertilization.

The first similarity is that policy diffusion and social network analysis share the same fundamental theoretical worldview. Both lines of research share the idea that the behavior of an actor cannot be adequately explained without considering its position in the structure of social relations. Network analysis rejects explanations „of social behavior as the result of individual’s common possession of attributes and norms rather than as the result of their involvement in structured social relations.“ (Wellman, 1983: 165) In the same vein, policy diffusion research explains policy change not only by referring to internal characteristics of states, but to their position
in relation to other states (Elkins and Simmons, 2005, Simmons and Elkins, 2004). Thus, both lines of research study the whole configuration of actors and their interrelations, rather than the attributes of the actors (Wellman, 1988a).

The five basic theoretical principles of network theory, as formulated by Wellman (1988b) can all be related to diffusion research. First, “structured social relationships are a more powerful source of sociological explanation than personal attributes of system members.“ (Wellman, 1988b: 31) The position of diffusion research is similar, albeit with a more empirical focus. Diffusion theorists argue that crucial explanations can be obtained by considering the way in which governments’ decisions are influenced by the choices made by others (Simmons and Elkins, 2004: 171-2). However, diffusion studies also include attributional variables in their studies. Thus, the position of actors in the network is thought to be an important explanatory factor, but it is an empirical question how important this factor is in relation to attributional factors.¹ Second, “norms emerge from location in structured systems of social relationships“ (Wellman, 1988b: 33) As the main explanatory goal of policy diffusion research is the spread of policies, not of norms, this principle needs re-formulation. But the central argument remains the same. Policies are not only influenced by domestic factors, but also by the networks created by resource dependencies, economic pressures and the exchange of ideas in the international system. Third, “social structures determine the operation of dyadic relationships.” (Wellman, 1988b: 35) This argument is less relevant, as policy diffusion research does not study dyadic relations, but large populations of nations.² Fourth, “the world is composed of networks, not groups.” (Wellman, 1988b: 37) This point is of immediate appeal to diffusion research. Comparative policy research often implicitly operates with categorizations of countries— e.g. the “worlds of welfare state” (Esping-Andersen, 1990), or

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¹ Early network theories argued that the network position of actors is the only explanatory factor that matters (White, 1970). Having its foundations in comparative political science, diffusion studies would argue that this constitutes a case of the „inverse Galton problem“ (Gleditsch and Ward, 2006: 923). Galton’s problem is the bias of conclusions that arise if interrelations between the units under study are neglected (Przeworski, 1987: 42, Jahn, 2006); the inverse Galton problem is the bias in conclusion that arises from neglect of individual factors. A more vivid description is „lemming model“ – the assumption that all actors follow network influences and no intrinsic motivations (Leenders, 2002: 25).

² However, it might be more relevant for policy transfer (Dolowitz and Marsh, 2000) or policy learning (Bennett and Howlett, 1992) literature, which studies policy transfer processes between two countries.
“varieties of capitalism” (Hall and Soskice, 2001). Diffusion research tries to substitute these classifications for more nuanced concepts that theorize how nations are interdependent (Simmons and Elkins, 2004). Fifth, “structural methods supplement and supplant individualistic methods.” (Wellman, 1988b: 38) Diffusion research has mostly chosen to supplement individualistic methods. Quantitative diffusion studies use regression models containing diffusion variables that indicate how nations are interdependent (Franzese and Hays, 2004, Simmons and Elkins, 2004). In this way, network and country-level explanatory factors are integrated into one methodological approach.

As a corollary to the similarities in theoretical outlook, the data used by both lines of research are basically the same. Diffusion research uses spatial econometrics to determine the influence that policy decisions in neighboring countries have on policy decisions in a target country: “Spatial lag models treat spatial dependence in the same way that time-series models treat serial correlation. Instead of lagging the value of the dependent variable one unit in time, one „lags“ it one unit in space. The spatial lag is the weighted average of the dependent variable in the actor’s „neighborhood.‟” (Simmons and Elkins, 2004: 178) Neighborhood need not be conceptualized solely on geographical terms. We can also think of neighbors in a communication network, neighbors as countries that share the same economic characteristics, or common membership in international organizations (Beck et al., 2006, Franzese and Hays, 2004). Thus, diffusion studies use genuine social network data to determine the ways nations are interdependent. In a second step, these data are used to weigh the policy decisions of neighboring states. The complete dataset consists of country-year-data indicating, e.g., what proportion of trading partners, weighed by their importance for the target state, has already adopted a certain policy: „…we seek to identify a country’s various competitive, normative, communicative, and cultural influences and combine this information with the policy „cue“ transmitted along that network.‟” (Simmons and Elkins, 2004: 178, Leenders, 2002) Thus, network data are used to generate data suited for regression analysis. But, as this paper argues, unearthing the network data from diffusion datasets can help diffusion

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3 Some diffusion studies acknowledge this (Elkins et al., 2006: 830), however, the full potential of the network data is seldom used.
research to gain leverage over several problems.

However, the similar underlying theoretical principles must not blind us for the fact that policy diffusion research has some features that separate this line of research from mainstream network analysis.

First, the explanatory goals differ. Policy diffusion research uses network reasoning and network data as a tool to explain the spread of policies, and to counter the assumption that governments decide independently. However, diffusion research does not aim to reason about abstract social structures, social roles and positions, as is the theoretical ambition of most network analyses (Mizruchi, 1994, Wellman, 1988a, Knoke, 1990).

Second, the units of analysis differ. Most network analyses use individual (Granovetter, 1972, Padgett and Ansell, 1993) or corporate actors (Davis and Greve, 1997) as their main unit of analysis. Research in this tradition tries to elucidate how network relations structure power positions of individuals in a community or a firm (Krackhardt, 1990), how social capital is gained by individuals (Burt, 1992), or how networks of organizations interact in policymaking (Kenis and Schneider, 1991), or business transactions (Granovetter, 1985, Uzzi, 1997). Policy diffusion studies instead use nation states as the fundamental unit of analysis.

There are some reasons to believe that this difference in unit of analysis has important theoretical and methodological implications. The first question is whether individual and corporate actors can be treated as analogous. Many of the analogies of network analysis and diffusion research are based on direct interpersonal relations. The question is whether these analogies hold for relations between organizations or national governments (Strang and Soule, 1998: 286). Second, a more specific problem arises with regard to the theoretical conceptualization of information networks between firms on the one hand and national governments on the other hand (Lazer, 2005). In the private sector, there is a considerable incentive to monopolize an innovation and capitalize on

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4 This assumption has long plagued comparative policy research and seems not suited for comparative policy analysis in the age of globalization (Jahn, 2006).
it using patent protection. In public policies, there is no such incentive (Lazer, 2005: 55). On the other hand, the incentive to adopt successful innovations is considerably less in the public sector, as market survival is less of an issue for bureaucracies.

However, there are also good reasons to believe that network theories and methods can be applied, notwithstanding the unit of analysis. First, network theories tend to work relatively well on different levels of analysis and are more likely to scale than individualist explanations (Borgatti and Foster, 2003: 1001, Marsden, 1990: 438, Maoz et al., 2003, Strang, 1991: 325). Second, there is a body of literature that already applies network methods to international relations. The “dependencia” or “world system” school uses data on trade or international organizations networks to determine the social structure of the world system (Knoke and Burmeister-May, 1990, Snyder and Kick, 1978). A more recent body of literature studies the effects of international organization networks on trade (Ingram et al., 2005) and conflict (Hafner-Burton and Montgomery, 2006). Third, national governments are, in effect, not fundamentally different from other organizations (Allison, 1969). They are corporate actors with a formal hierarchy, an internal structure and specific goals and preferences.

Thus, network analysis methods may be applied to networks between states or national governments. However, analysts should be sensitive about how far the network metaphors can be applied, e.g., in what ways nations “learn”. Every concept of network analysis needs to be assessed as to in how far it can be applied to networks between nations.

The third difference between network analysis and diffusion research concerns the data used. As has been argued, the fundamental structure of the data is the same. However, in practical applications, some differences emerge. Network analyses often use binary data to characterize network relations. This is perfectly valid for populations of organizations or individuals. If the populations are large enough, not all actors are interconnected. Thus, an analysis of who is connected to whom leads to meaningful descriptions of network patterns. In policy diffusion research, however, this does often not suffice. Nearly every state in the world is directly connected
to every other state (e.g. via the UN or by diplomatic representations). This is all the more true, if as we believe that we live in times of globalization. Thus, meaningful data must indicate the intensity of the relation (e.g. proportion of foreign direct investment on the target state’s GDP). Another difference is that diffusion data are by definition longitudinal data and cover long time spans. While this is of course possible in network analyses, network analyses often use data covering one time point only.

A fourth point concerns not so much differences between the two lines of research, but the question how the two phenomena networks and diffusion are related. Diffusion (conceived as an outcome, i.e. the spread of a policy over a set of countries) need not be structured by networks. It is quite plausible that many policies spread along the nodes in a network (however conceived), but diffusion-as-an-outcome may also result from top-down processes, e.g., the spread of world culture (Meyer et al., 1997) or coercion by powerful actors (Meyer and Rowan, 1991). In both cases, the networks between countries do not matter, as the new policies are introduced top-down. On the other hand, diffusion conceptualized as the process of horizontal spread of innovations (Elkins and Simmons, 2005) is by definition conditioned by networks.

Thus, diffusion studies and network analysis share enough similarities to merit further investigation of the potential for theoretical synergies.

**What policy diffusion research can learn from network analysis**

This section argues that diffusion research can profit from the established theoretical body and methodological toolbox of network analysis. As the previous section has argued, both strands of research have considerable theoretical and methodological intersections. However, these intersections have often been overlooked. It is the purpose of this section to explore systematically the benefits of network analysis for diffusion research.

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5 This is all the more true, if the set of countries under study is limited to, e.g., the OECD countries, which are by definition all directly interconnected.
The first benefit of social network analysis for diffusion research is the re-direction of attention to the actors in the network that drive diffusion. Diffusion research is often accused of “technocratic determinism”, in which new policies spread over a population of countries, without actions of purposeful actors, just by virtue of their interconnectedness (Rose, 1991, Stone, 1999, Dolowitz and Marsh, 2000, Evans and Davies, 1999). Network methods help to identify powerful or important actors in a diffusion network. As the previous section has argued, diffusion data basically include network data. The network data are only transformed into network weights (Leenders, 2002), and a dataset suited for regression methods is constructed. But if the original network data that inform the network weights are available, it is possible to employ network measures of actor centrality or prestige (Freeman, 1979, Wasserman and Faust, 2007: 169-219) and to identify important actors in a policy diffusion network. This is interesting in itself. Additionally, it may inform further research. In line with the basic theoretical perspective of diffusion research, such measures may form the basis of empirically grounded case selections for further case studies. Thus, countries are selected for further investigation not because of their individual characteristics, but because of their structural position in a diffusion network, which resonates well with the overall theoretical ambition of diffusion research.

A second and closely related benefit is that network concepts of power can inform diffusion studies. Diffusion research still has to adequately conceptualize the role of power in diffusion processes. The accusation of “technocratic determinism” (Rose, 1991: 9) does not only pertain to the neglect of actors, but also the neglect of power differences between actors. The distinction between positively and negatively connected networks can help to render diffusion studies more specific.

Network theory has long debated the question of power in networks, until the distinction between positively and negatively connected networks emerged (Bonacich, 1987). The essential point is that different network positions can be considered powerful, depending on the prevailing logic in the network (Bonacich, 1987, Mizruchi, 1994).
Negatively connected networks are exchange networks, in which actors exchange rare resources. The overall logic of exchange creates dependency relations, as some actors have more suppliers of rare resources than others. For example, a firm can only buy its raw material from a limited number of suppliers. If it buys them from supplier A, this implies that it does not buy them from suppliers B, C, and D. A network connection to supplier A automatically means less strong (or no) connections to the other suppliers. Thus, power in negatively connected networks depends on the structural autonomy of an actor (Burt, 1992). If an actor can obtain vital resources from many possible sources, this actor is structurally independent, and may even play out the suppliers against each other. If, on the other hand, an actor has only one supplier of rare resources, she is in a weak position, as she depends on this supplier. Thus, having many powerful network partners diminishes the power of an actor (Bonacich, 1987). A special case is the role of brokers. These actors occupy strategic positions in a network and organize exchange between actors that would otherwise be unable to exchange with each other. From this position, the broker can reap extra profits (Burt, 2005).

Positively connected networks, on the other hand, are information networks, in which the relations between the actors are additive and complementary. Being connected to actor A does not preclude also being connected to actors C, D, and E. Furthermore, the more connections an actor has, the more resources like information she can mobilize. Being well connected to other actors that are also well connected is no liability (as in the negatively connected networks), but an asset. Thus, power positions differ, depending on whether a network is positively or negatively connected.\textsuperscript{6}

Diffusion research has up to now not used this distinction. Positively and negatively connected networks are basically treated the same. However, if this distinction would be used, diffusion research would be able to more precisely identify powerful actors. In the same set of nations, different nations may be powerful, depending on which network is studied. Thus, a more

\textsuperscript{6} In terms of a classical distinction of political science, one could argue that in negatively connected networks, power positions emerge (based on the flow of resources and blackmailing potential), while authority positions (based on trustworthiness and information) emerge in positively connected networks.
nuanced concept of power can be obtained by distinguishing positively and negatively connected networks and the different bases of power.

Third, the distinction between structural and relational approaches to networks renders diffusion theories more specific. The fundamental difference is how the ties in the network are treated, whether their structural configuration, or whether the resources transmitted through them, are causal for behavior (Borgatti and Foster, 2003: 1003, Burt, 1987).

Structural approaches are primarily interested in the overall topology of networks, and neglects the content of the ties (Borgatti and Foster, 2003: 1002). From this perspective, similarities in behavior arise out of common environmental pressures due to structurally similar network positions. For example, two nations that have the same set of trading partners face the same economic pressures, regardless whether they are interconnected or not (White et al., 1976, Burt, 1987). Their “structural equivalence”, that is, their structurally similar network position, not their direct interconnections, lead to similarities in their behavior (Borgatti and Everett, 1992). Structurally similar actors may be grouped in “blocks” of structurally equivalent actors, using blockmodeling. The complexity of social networks is thus reduced to a few basic network positions (White et al., 1976). Another way to conceptualize this theoretically is the idea that structurally similar actors act as each others role models (DiMaggio and Powell, 1983). Both theoretical perspectives highlight that actors need not be directly interconnected to have an influence on each other’s behavior, rather, it is the structural equivalence of their network position that matters.

Relational approaches study networks with regard to direct interconnectedness. The ties between the actors are seen as conduits, through which information between the actors flow (Lin, 2001). From this point of view, inter-actor transmission is crucial. Actors behave similarly because (and insofar as) they are directly interconnected. New ideas, policies or norms spread along friendship networks and are most homogeneous in densely connected “cliques” (Davis, 1991).

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7 Other ways to express this distinction are „topology versus flow“, „girders versus pipes“, „equivalence vs. cohesion“ (Borgatti and Foster, 2003), or „communication versus comparison“ (Leenders, 2002: 30)
Diffusion studies often use both structural and relational approaches contiguously, but could benefit from more attention to the differences between the two approaches. Different mechanisms of policy diffusion stand behind the two approaches (Burt, 1987). While the idea that structurally equivalent countries influence each other does not presuppose direct contact between the two countries, relational approaches imply direct connections (Mizruchi, 1994: 333). Thus, in the latter case, case studies should show how direct influence between two interconnected countries occurred. Applied to a classical question of diffusion research the distinction can be formulated as a fundamental research question: Do we believe that the Czech Republic mimicks Slovakia – which may be due to structural equivalence as well as cohesion – or do we believe that the Czech Republic also mimicks Argentina and Brazil – which is more likely due to structural equivalence and not to direct interconnections?

A fourth way in which diffusion research can benefit from network analysis is the use of network visualization techniques (Brandes et al., 1999). Diffusion studies often rely on regression analysis to communicate their substantive results. However, as has been argued, diffusion data contain network data, and these data can be visualized. This can be done as a first step in regression diagnostics, in order to assess the residuals of a regression model and search for omitted variables (Krempel and Plümper, 2003). However, the explanatory potential of network graphs is also considerable. It helps to assess the structure of diffusion networks, graphically display their change over time and communicate results about relative positions of nations in global networks (Brandes et al., 1999). Combined with information about the attributes of nations, these visualizations can supplement or supplant the regression methods currently used by diffusion studies (Krempel and Plümper, 2003).

What network analysis can learn from policy diffusion research

The beneficial relationship between network analysis and diffusion research not
unidirectional. Network analysis can also profit from policy diffusion research.

First, diffusion research counters the claim that network analysis is “butterfly collecting” (Boissevain, 1979) and instead shows that networks matter (Marsden and Friedkin, 1993: 127, Knoke and Kuklinski, 1983: 13). Diffusion research can be used to answer substantive research questions that are of interest to many in the fields of political science, international political economy and international relations. Diffusion research has shown that international network structures matter for the speed and scope of policy change in many different policy fields (Simmons and Elkins, 2004) (Swank, 2006, Elkins et al., 2006). Thus, international networks are not analyzed for their own sake, and not in a descriptive manner, but with a substantive explanatory goal. Additionally, diffusion research shows that networks matter in a rigorous and empirical manner. Often, political science applications use network terminology only metaphorically (Dowding, 1994, Dowding, 1995, Marsden, 1990: 436). While this is certainly not true for all applications (see e.g. Schneider (1988) or Pappi (1998) for counterexamples), often, the critique holds. Instead, policy diffusion research uses the rigorous instruments of spatial regression models. Thus, networks are not used as a metaphor, but inform statistical models in a rigorous and reproducible way.

Second, diffusion studies can systematically test network explanations against competing explanations. Network analyses that rely only on network methods and network data are susceptible to the accusation that they neglect to test alternative hypotheses (Wellman, 1988b: 48). Diffusion studies de facto integrate network data in the hypothesis-testing logic of regression models (Ingram et al., 2005, Davis and Greve, 1997). As the network data are used to compute network weights for the dependent variable of interest (Burt, 1987: 1295-7, Leenders, 2002), they become amenable to regression analysis. The network data are transformed in the process, but can be dealt with on the same analytical level as attributional data – without losing their intrinsic network character. In this way, network explanations can be tested against attributional explanations, and their relative explanatory value assessed. This is a big step forward in integrating network and non-network modes of explanation into overarching frameworks.
An implication of this hypothesis-testing logic of inquiry is the possibility to test which of the many conceivable networks matter (Hedström, 1994: 1117, Strang, 1991: 326). Network explanations cannot only be tested against attributional explanations, but also against each other. In international policy diffusion research, e.g., a major research question is whether information or competition networks drive diffusion of policies. Thus, diffusion studies do not only show that networks matter, but more precisely which networks matter, relative to other factors. For example Elkins, Guzman and Simmons (2006) demonstrate that competition networks matter for the diffusion of bilateral investment treaties, while cultural networks constituted by religion, language, or colonial heritage links have no such effect. A similar finding is reported by Swank (2006) who asserts that tax policy spreads through competition, but not through cultural networks. On the other hand, Simmons and Elkins (2004) report that liberalization policies spread through networks of capital competitors and networks of culturally similar countries. As heterogeneous these results may still be, they show the future direction for network analysis and diffusion research: the systematic assessment which networks matter in which policy area.

The potential applications are manifold. As most diffusion studies de facto theorize and operationalize a wide variety of networks – in cohesion as well as in structural equivalence terms – they may be applied to adjudicate empirically in the cohesion versus structural equivalence debate (Burt, 1987). For example, one may interpret Simmons and Elkins (2004) finding that liberalization spread through networks of structurally equivalent competitors (and not through networks of bilateral investment treaty or preferential trade agreements) as evidence for a structural equivalence and against a cohesion view of network influence.

Methodologically, the combination of spatial econometrics and event history methods is a rigorous way to incorporate network data into regression models. Event history methods overcome the problems inherent in many of the older combinations of network analysis and OLS regression models (Burt, 1987, Marsden and Podolny, 1990: 198, Strang, 1991). Event history methods conceptualize the risk of a unit (in most diffusion studies: nations) to experience an event (in most
diffusion studies: the adoption of a specific policy) conditional on several independent variables (Box-Steffensmeier and Jones, 2004). As has been outlined, among these may be network variables, conceptualized as network weights, besides attributional and system-level variables (Davis and Greve, 1997, Davis, 1991, Simmons and Elkins, 2004).

This methodological line of action conceptualizes the relational character of the networked international order better than the attempts of the world system school. World system studies use network analytical techniques (mostly variants of blockmodeling) to identify different network positions in the world system (Snyder and Kick, 1978, Kick and Kiefer, 1987, van Rossem, 1996). Typically, the result is a classification of countries as core, periphery, or semiperiphery. These classifications, in turn, are introduced into regression models as predictors of dependence or economic growth (Snyder and Kick, 1978: 1118, van Rossem, 1996: 523). However, this can be seen as anathema to the relational paradigm, as the relations between countries are de facto again reduced to attributes characterizing nations, and the network data do not contribute to the regression analysis anymore. As has been argued, diffusion studies utilize the network data to obtain network weights which inform the regression models. This is more in line with the relational approach than using network data to generate new labels for countries.

Third, diffusion studies are inherently dynamic applications of network analysis. Network analysis is often criticized for its static worldview (Trezzini, 1998, Jansen, 2003: 277, McKelvey, 1999). Often, networks are studied at one point in time (or a handful of time points) (Marsden and Friedkin, 1993: 136, Mc Kelvey, 1999: 300). As diffusion processes always play out over long time periods, diffusion data span long time periods. Thus, quantitative diffusion studies use, in effect, long-term data about international networks. Once we acknowledge this, there are two ways to proceed. We can view diffusion studies as analyses of dynamic networks, with a special research question: how a certain trait (in this case, a policy) diffuses in a network over time. Alternatively, diffusion analysts and network analysts can share their data, to elucidate the causes of international network change. The data that diffusion studies use as independent variables – the international
networks constituted by trade, or international organizations – may as well be used as dependent variables. The aim would then be to explain why and under what conditions the international networks, of, e.g., international organization membership changes. Thus, network analysts can use a rich source of data over longitudinal developments in international networks.

**The application: Which international networks matter?**

This section demonstrates the benefits outlined in the previous sections by re-interpreting current diffusion studies in network analytical terms. Most diffusion studies cast their research question in terms of diffusion *mechanisms* (Simmons and Elkins, 2004). However, they de facto operationalize different *networks* and assume that we can equate networks with corresponding mechanisms (see, e.g., the operationalization sections in Simmons and Elkins (2004) or Henisz, Zelner and Guillén (2005)).

The analysis will be conducted as a meta-analysis of current diffusion studies. The studies are selected according to three criteria. First, they cover a large set of countries; second, they have been published in high-profile journals; and third, they test different network explanations against each other. The studies analyzed are Simmons and Elkins (2004), Elkins, Guzman and Simmons (2006), Henisz, Zelner and Guillén (2005), Lee and Strang (2006), and Swank (2006). These studies try to explain the spread of different policies: the spread of financial market liberalization (Simmons and Elkins, 2004), infrastructure privatization (Henisz et al., 2005), tax policies (Swank, 2006), bilateral investment treaties (Elkins et al., 2006), and public sector downsizing (Lee and Strang, 2006).

The chosen studies may all be analyzed with regard to one network-analytical meta-question: What kinds of international networks condition the spread of policies? As all these studies postulate several networks and test them as competing explanations, a synthesis should elucidate which international networks matter most for the spread of policies. Specifically, the question is whether
the international system is structured more by cohesion or structural equivalence.⁸

Elkins, Guzman and Simmons (2006) postulate five different networks along which the spread of bilateral investment treaties may spread. First, along competition networks conceptualized as the similarity of export relations. Second, as competition with similar export products. Both networks may be interpreted as competition networks among structurally equivalent actors (Burt, 1987). The other three networks are networks of religion partners, language partners, and (former) colonial partners. These networks may be interpreted in cohesion terms, as information is supposed to flow along the cultural ties.⁹

Their result is that the similarity of export relations and products are the causally most important networks (Elkins et al., 2006: 842). That is, the analysis lends support to a thesis that structural equivalence networks structure the world system. Cohesion networks, constituted by cultural ties show no influence on the spread of bilateral investment treaties (Elkins et al., 2006: 840)

Swank (2006) postulates six different diffusion networks along which tax policy reform spreads. First, he conceptualizes the notion of homogeneous mixing, that is, the assumption that horizontal influence occurs, but is not conditioned by networks. Second, a network structured by trade flows. Third, a network structured by FDI flows. As both of these networks are conceptualized using direct flows (not of similarity of relations), they reflect cohesion arguments. Fourth, the similarity of capital market orientations, which may be interpreted as structural equivalence. Fifth, families of nations, which may be seen as a cohesion argument – countries of the same family of nations share information. A sixth network in Swank’s (2006) analysis is a network of trade relations to the U.S. (Swank, 2006: 862), which is again conceptualized in cohesion terms (the

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⁸ It should be noted that all the studies use different control variables to control for internal as well as systemic external factors. For the purpose of the meta-analysis, only the network variables are considered, with one exception: some of the studies explicitly include a variable that indicates homogeneous mixing, which is equivalent to the assertion that networks do not matter for policy diffusion. If this null hypothesis is considered in the studies, it is included in the meta-analysis.

⁹ Simmons, Guzman and Elkins (2006) do not explicitly refer to the cohesion vs. structural equivalence distinction. However, this interpretation is consistent with their argument.
direct flows are conceptualized).

The result is, that none of the postulated networks matters, apart from the closeness to the U.S. (Swank, 2006: 873-4). However, this network spanned around the U.S. as the focal actor is extremely influential, as national tax reforms follow the lead of the U.S.

Lee and Strang (2006) postulate five different networks along which public sector downsizing diffuses. Like Swank (2006), they include homogeneous mixing as a null hypothesis. Second, they include a (nonsocial) network of spatial proximity which may be interpreted as a cohesion argument. Third, they include the network of direct trade flows. Fourth, they also include trade closeness to the U.S., conceptualized as the fraction of each country’s imports and exports that come from and go to the U.S. (Lee and Strang, 2006: 894). Both can be interpreted as cohesion arguments. Fifth, they apply a classical structural equivalence argument: they include a measure of competition that weights dyads by the extent to which they trade with the same countries (Lee and Strang, 2006: 894).

Lee and Strang’s result is that homogeneous mixing might indeed take place, however, they are cautious in their interpretation and argue that common economic shocks may be produce the same diffusion pattern (Lee and Strang, 2006: 899). Another important result is that countries follow the lead of the U.S., and of countries with which they have strong trade bonds. Thus, Lee and Strang’s analysis supports relational arguments but not structural equivalence arguments: “Influence is particularly strong between neighbors and countries that trade extensively with each other, which is suggestive of an underlying process of emulation linked to information flow and cultural similarity. We see correspondingly little sign of competitively driven influence between trade rivals.” (Lee and Strang, 2006: 903)

Henisz, Zelner and Guillén (2005) study the diffusion of market-oriented reforms in infrastructure sectors and basically postulate two different networks. They clearly articulate their affinity to network analysis and explicitly term their hypothesized networks trade cohesion (Henisz et al., 2005: 876-7) and role equivalence (Henisz et al., 2005: 878). Thus, their research design
reflects a competing test of both theories of network influence.

Their results are mixed. Different sectors (electricity and telecom) and different reform elements (privatization, liberalization) exhibit different network dynamics. However, on balance, the role equivalence arguments finds more support in their analysis (Henisz et al., 2005: 890)

Simmons and Elkins (2004: 179-180) postulate ten different networks along which market liberalizations may diffuse. First, they test for the null hypothesis of homogeneous mixing. Second, they postulate a network of trade competition, operationalized as similarity of trade patterns. Third, a network of competition operationalized using the Standard & Poor’s ranking. Both may be interpreted as structural equivalence arguments. Fourth and fifth, communication networks operationalized over common membership in preferential trade agreements and bilateral investment treaties. Sixth and seventh, direct bilateral trade links and telephone traffic. Lastly, language, colonial and religion partner networks are postulated to be influential in diffusion.

The result is that the networks constituted by capital competition and religion partners channel the diffusion of market liberalization. Thus, Simmons and Elkins’ analysis supports structural equivalence as well as cohesion arguments.

As can be seen from Table 1, there is no agreement about what networks structure the international system. While some of the studies find evidence for policy diffusion along networks of structural equivalence, others see policy diffusion as conditioned by direct cohesive links.

This disagreement may be due to three causes. First, it may be due to the characteristics of the different policies under study. However, while this may be true for some of the policies – especially the signing of BITs stands out in this regard – many of the policies – privatization, public sector downsizing, liberalization – are similar in ideological underpinnings, political cleavages, and redistributive consequences. Thus, they can be considered most similar cases and should be subject to similar diffusion dynamics. Second, the different operationalizations of the networks may lead to the contradictory results. This may be part of the answer. As has been argued, current diffusion
studies pay little attention to the established body of knowledge of social network analysis. Correspondingly, they use very different concepts to operationalize the networks they hypothesize. In order to generate cumulative knowledge, a more unified approach – or a re-analysis using the same concepts – would be in order. However, a third possibility is equally plausible: the world is indeed structured by multiplex networks, by cohesive as well as structural relationships, and the heterogeneous results simply reflect a complex world.

Table 1: Networks postulated by different diffusion studies

<table>
<thead>
<tr>
<th>Author</th>
<th>Dependent Variable (Policy)</th>
<th>Postulated Networks</th>
<th>Causally most important network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simmons and Elkins</td>
<td>Financial market liberalization</td>
<td>Similar trade relations to other countries (structural equivalence) Competition for investment capital Direct trade partners (cohesion) Common membership in BITs Common membership in PTAs Same religion Same language Same colonial partners</td>
<td>Competition for investment capital (structural equivalence) Religion partners (cohesion)</td>
</tr>
<tr>
<td>Elkins, Guzman and Simmons (2006)</td>
<td>Bilateral investment treaties</td>
<td>Similarity of export relations Similarity of export products Same religion Same language Same colonial partners</td>
<td>Similarity of export relations and products (structural equivalence) Same religion (cohesion)</td>
</tr>
<tr>
<td>Lee and Strang (2006)</td>
<td>Public sector downsizing</td>
<td>Homogeneous mixing Spatial proximity Trade flows Trade with the U.S Competition (~ structural</td>
<td>Trade with the U.S. (cohesion) Trade flows (cohesion)</td>
</tr>
</tbody>
</table>
However, apart from the disagreement about which specific networks matter, all policy diffusion studies agree that the international system is to a large extent structured by networks. Homogeneous mixing – the thesis that networks do not matter for the spread of policies – is mostly disconfirmed. The overall picture that emerges is one of a world structured by different links and interdependencies, of structural equivalence as well as by direct, cohesive links.\(^\text{10}\)

Thus, policy diffusion research empirically supports arguments made by network analysts. Networks matter not only as structures in which individual or corporate actors are embedded, but also on a global scale. Global networks do not only exist, but they have concrete implications for the spread of new policies.

Conclusions

This paper has demonstrated why and how network analysis and policy diffusion research can enter into a fruitful dialogue. Both strands of research share fundamental theoretical assumptions and methodological approaches, and can complement each other.

There are plenty further lines of research in which combinations of network analysis and diffusion research can be applied.

First, policy diffusion studies and network analysis may be combined to elucidate a more nuanced picture of globalization. Most current empirical studies of globalization at least implicitly

\(^{10}\) This finding is complementary to most applications of world system theory, which focus on the structuring effect of structural equivalence (van Rossem, 1996, Snyder and Kick, 1978). This line of research supposes that economic networks partition all nations into structural world-system roles. However, in the current formulation, world system theory neglects the cohesive links between nations that also structure the international landscape.
treat globalization as a universal and uniform phenomenon, that affects all countries equally. The use of general openness indicators (Quinn, 1997) – e.g. in Schneider, Fink and Tenbücken (2005) – de facto treats globalization as a uniform phenomenon and neglects the networks that structure international exchange. Diffusion studies and network analysis argue that globalization is structured by global networks, and that some countries are more centrally located in these networks than others. Still other countries may be virtually unconnected to the rest of the world and constitute backyards of globalization. Combining policy diffusion studies and network analysis would elucidate, which political, economical and cultural networks matter most in structuring the international landscape, and how these networks have changed over time (Beckfield, 2006).

Second, concerning one of the cornerstones of international relations, a network approach could develop a more nuanced concept of the international system. International relations theorizing has long acknowledged that nations are interdependent (Keohane and Nye, 1977). International relations theorizing has to a large extent focused on the regimes that are created to govern this interdependence and to reduce negative externalities (Krasner, 1983, Stein, 1982). However, not all interdependencies are targeted by international regimes. Presumably an even larger part of the international system is shaped by uncoordinated interdependence (Elkins and Simmons, 2005). It would be the task of diffusion research and network analysis to elucidate the structures that emerge from uncoordinated interdependence, and their policy implications.

This paper can be understood as a call for closer cooperation between policy diffusion research and social network analysis. Both lines of research essentially work with the same data. Additionally, their theoretical assumptions are compatible. They analyze different facets of a complex phenomenon – the networks that condition diffusion and the diffusion itself – and may be combined in joint projects to yield an analytical benefit, in which the whole is more than the sum of its parts.
Literature


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