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Essay

Heading Toward a Society of Networks

Empirical Developments and Theoretical Challenges

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In the essay, it is first argued that Western societies are moving towards a society of networks, i.e. a society, in which the formal, vertically integrated organization that has dominated the 20th century is replaced or at least complemented by consciously created and goal directed networks of three and more organizations (whole networks). To substantiate this proposition we describe and analyze the development of organizational forms and the subsequent scientific efforts to grasp these developments theoretically and methodologically in the last 200-300 years. Second, the current state of network theory is briefly evaluated with regard to whole networks. In a third part, future research avenues concerning the development of theories that explain the coming into being, functioning, structure, governance and dissolution of whole networks (network theories) are discussed.

Keywords: whole networks, network theory, network identity, social organization

Introduction: Heading Toward a Society of Networks

In October 2007 a network of three medium banks beat one of the largest players in the world financial markets, Barclays and by taking over Dutch multinational bank ABN AMRO realized the biggest European banking takeover in history.[1] After the takeover battle had ended ABN AMRO was carved up and the parts distributed among the three network participants, each having been smaller than ABN AMRO. After the transactions were conducted the network was dissolved. This spectacular takeover symbolizes several things. First and foremost, a network beat two very powerful single organizations. Second, the network was consciously created as an organizational form to achieve a specific goal, thus not being just an emergent phenomenon out of bilateral interactions. Third, it was set up as a temporary organizational form that was to be dissolved after the task had been accomplished and fourth the network came into being on the basis of complementary interests and needs of the participating parties. However, one year later, it appeared that one of the three participants in the network, Belgian bank and insurance company FORTIS, had overplayed its hand and was unable to ultimately finance its part of the deal which in the context of the global credit crisis led the bank into a tailspin that could only be stopped by

a partial nationalization.[2] This development demonstrates the fifth and last point, that goal directed networks are not infallible and can also produce unfavorable outcomes.

Inter-organizational networks and consortia are of course not new, but we can observe in many areas such as public management, health care, innovation, research and development as well as the creative industries the increasing number and importance of networks, which in this essay we define as consciously created groups of three or more autonomous but interdependent organizations that strive to achieve a common goal and jointly produce an output. Therefore, serendipitous networks, i.e. networks that are not goal directed and come into being as emergent entities through the dyadic interaction of actors are not included in this definition and are seen as a different organizational form. Many authors (among others Alter & Hage, 1993; Castells, 1996) have made the claim that we are entering a new era in which networks as a new institutional form will increasingly replace markets

and hierarchies. The main focus in this literature to date, however, was on networks that emerge often incidentally from dyadic interactions. Networks are thus conceptualized as aggregates of bilateral contacts and exchanges (Simon, 1991). The emphasis in this discussion is on the increased connectedness between actors in the last several decades and on networks crossing various types of borders (territorial, sectoral, organizational). Goal directed, consciously created, bounded and governed networks as a new organizational form have to date received much less attention (Provan, Fish, & Sydow, 2007).

In this essay we would like to contribute to research and theory development of consciously created and goal directed social entities. In addition, we argue that these networks over time develop a separate identity. We can therefore distinguish between serendipitous networks as "networks an sich" ("networks in itself"), which do not develop a collective identity and consciously created goal directed networks as "networks für sich" ("network for itself"). Similar to Marx who used this distinction with regard to social class we see the defining difference in the common consciousness, the ability of the latter to form a separate identity and to act collectively, while in "networks an sich" participants are similar on several individual traits but are not conscious about them and do not act collectively.[3] We argue that it is the "network für sich" that represents a new organizational form which is about to become the new dominant form in the future replacing the formal hierarchical organization that has dominated the 20th century. We therefore claim that we are on the way to becoming a society of networks.[4]

To substantiate that claim, we first look at the empirical and theoretical developments with regard to the dominant organizational forms in the last 200 years in order to demonstrate the developmental logic of organizational forms. Next we argue that given the movement toward a society of networks scholars need to develop especially network theories, i.e theories that explain the coming into being, governance, functioning, effectiveness and failure of such "networks für sich." Finally, we discuss what network theories could look like, the building blocks we already have and the promising directions for future research.

Empirical and Theoretical Developments of Social Organization in the 19th and 20th Century

Perrow claimed in 1991 that we were living in a society of organizations. Indeed, large formal, hierarchical organizations had become the dominant collective social entities

in many societies during the 20th century that influenced the lives of human beings enormously from the cradle to the grave and formal hierarchical organizations are still a very powerful force to be reckoned with. The question, however, is, whether we are entering a new phase of development in human organization, in which networks become the new dominant force.

With globalization and the information and communication technology revolution since the 1970s one can observe the development of the network society (Castells, 1996), in which people, organizations and societies are increasingly linked on a global scale. Thus, we saw the development of myriads of new relationships between individuals but also organizations. Of course individuals and organizations were embedded in social relations before. What was new, however, was that geographical space became less important for the formation of ties and that ties that were forged while the actors were geographically proximate, could now be maintained longer after people or organizations relocated. Most often, these networks as aggregates of dyadic relations were not consciously designed but were emergent social systems consisting of individual or corporate actors and their bilateral interactions. Thus we claim that after this outburst of unplanned, uncoordinated linking, we now seem to be moving from a network society in which "networks an sich" (network in itself) was the new phenomenon to a society of networks, in which "networks für sich" (network for itself) become more and more important.[5] Of course as with any novel organizational form, they still struggle to gain legitimacy in many countries (Provan, Kenis, & Human, 2008).

As is shown in table 1, the empirical and theoretical developments of organizational forms in the last 200–300 years can be analyzed around central topics of organizational analysis such as identity, the development of legal personality, time horizon of existence, control, units of analysis and the development of theoretical concepts.

Empirical Developments

If we look at the development of organizational forms over the last two centuries we can observe very interesting similar evolutionary patterns in the transition from small entrepreneurial firms to large formal organizations on the one hand and from networks as emergent entities to networks as a consciously created organizational form. In the transition from the early hierarchical organizations in the 17th, 18th and 19th century ("organizations an sich") to the large, formal and impersonal organizations (corporations) of the 20th century, people working in

Table 1
Heading Toward a Society of Networks?

Time Period	Society of Individuals and Families/ Gemeinschaft (Durkheim, Tönnies, Simmel) 17/18/19th century- ?	Society of Organizations (Weber, Perrow, & Simon) 1900- ?	Network Society (Castells) 1970s- ?	Society of Networks 2000s- ?
Empirical developments				
Societal and technological developments	Industrial Revolution, Increasing individual specialization	Rise of bureaucratic mass organizations, organizational integration	Globalisation, Information Technology Revolution/ web 1.0, increasing organizational specialization	Web 2.0, network integration
Organizational forms	Organization an sich	Organization für sich	Network an sich	Network für sich
Identities	Individual identity	Individual and organizational identity	Individual and organizational identity	Individual, organizational and network identity
Legal persons	Individuals	Individuals and organizations	Individuals and organizations	Individuals, organizations, and networks
Time horizon of organizational forms	Individual lifetime with possible family succession	Open ended	Open ended	Temporary
Competition dominated by	Individual entrepreneurs	Large organizations	Organizations and alliances	Changing networks/ groups of organizations
Dominant forms of control	Cultural or clan control, personal centralized control	Formal bureaucratic control	Output control, reputational control	Self control, reputational control
Theoretical and methodological developments				
Additional unit of analysis	Individuals and societies	Organizations	Dyadic ties and networks as emergent systems	Networks as consciously created organizational forms
(Additional) research methods	Observation and theoretical reasoning	Statistics based on attribute variables	Network analysis based on relational variables	Network analysis based on relational variables and statistics on network level attributes
Important theoretical concepts	General sociological theory	Scientific Management, Contingency theory, Neo-institutional theory	Transaction Cost Theory, Resource Dependence Theory	Network Theory (whole networks)

these organizations began to develop an impersonal organizational identity ("organizations für sich") while until the end of the 19th century the relationship was very often still a personal one between employee and individual entrepreneur.[6]

As organizations and networks for themselves are both goal directed bounded social systems, identity formation follows similar patterns. As employees working closely in whole networks as representatives of their organizations with colleagues in other organizations, we can often observe that they form some kind of common network identity across organizational boundaries albeit to a different degree (Bechky, 2006, Rometsch & Sydow, 2007). Identity is seen as a structural property "that

emerges from (inter-)organizational practices of network members when answering the question 'who are we as a network'" (Rometsch & Sydow, 2007, p. 31). These structural property refers to the network as a whole focusing first on the essence of the network (centrality), second on the uniqueness in comparison to other networks (distinctiveness) and a more or less enduring character (continuity) (Rometsch & Sydow, 2007, p. 26).[7] These properties get institutionalized over time in beliefs about what the collective body is about and manifest themselves in symbols and artifacts. Human and Provan (2000) for example report that the installation of a showroom for a network of wood processing companies, where products of member firms were exhibited and sold, was a

major boost for the development of a network identity ('who are we') and for its internal legitimacy. As we can see for example in airline alliances like the Star Alliance (Mintzberg, Lampel, Quinn, & Ghoshal, 2003, pp. 124-137), interorganization networks at least try to construct a network identity by creating common symbols, logo's, joint marketing, etc. in order to create a common orientation across organizational boundaries. In addition, interorganizational networks' identities might be enacted and reproduced by joint detailed operation manuals, boundary spanning activities, interorganizational committees, and other coordination and control mechanisms (Rometsch & Sydow, 2007, p. 22). In both organizational and network identity formation, the identities are formed in a continuous recursive process, i.e. through the interaction of the collective with the individual level. Here lies therefore a decisive difference between the organizational and the network identity. While in the organization identity formation the organizational and the individual level interact, in network identity formation processes all three levels, the network, the organization and the individual level play a major role. The existing individual and organizational identities, therefore, are not replaced by a new network identity. Rather, people in these types of work situations will increasingly have an individual identity, an organizational identity and possibly also a network identity in their working lives, thus adding another layer and increasing overall complexity (Håkansson & Ford, 2002). In a majority of networks, if successful, the network and the organizational identities will overlap to a considerable degree, however, depending on the type of network, organizational and network identity can be both developed to a different degree. Rometsch and Sydow (2007) therefore suggest to apply an analytical framework that jointly analyzes organizational and network identities (see Figure 1 below).

However, if one asks "who are we as a network," it is implicitly assumed that it is clear, who or what "we" is, i.e. a social entity that is bounded. Therefore, identity formation can only take place on the basis of inclusion. This in turn means that there must also be exclusion, i.e. a definition of who or what does not belong to the social entity. The development of "network for itself" thus goes to a certain degree against the notion of high connectedness emphasized in the network society but rather re-emphasize the notion of inclusion and exclusion. As a consequence, bounding the social system is (again) of central concern, although as we argue below, boundaries very often remain flexible and fluid for whole networks. If a collective network identity is part of 'network for itself," people in the participating organizations involved

Figure 1
Relationship of the Identities of Networks and Organizations—A Typology With Examples (Rometsch & Sydow, 2007, p. 42)
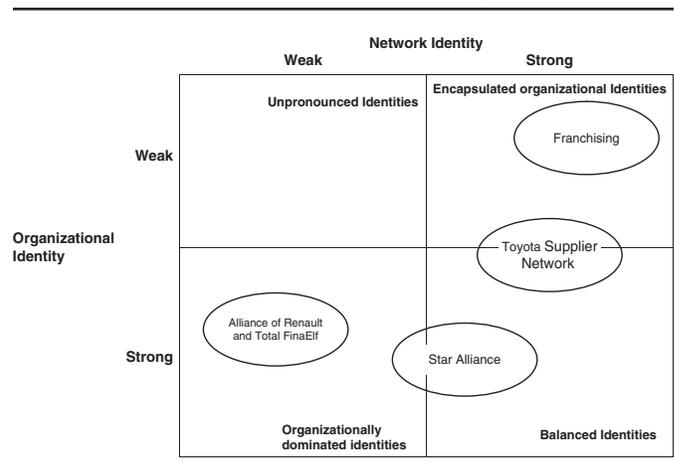

in the activities of a particular network should show some sense of belonging and identification with the network activities. It is thus the perception of other participants who are part of the network and the selfdescription of an organization and its employees as being part of a network that determines the boundaries.

Very often, these goal-directed networks have a temporary character. During the 1980s and 1990s organizations started concentrating on their core competencies and very often outsourced support functions. But also work of individual entrepreneurs for example in the creative industries became more specialized in the last decades (Jones & Lichtenstein, 2008). In today's societies customer lifestyles and preferences change rapidly and organizations-having cut their activities to their core business and individual entrepreneurs having narrow specializations–are now inclined to team up with other organizations/individuals to respond to these fluid customer preferences (Prahalad & Ramaswamy, 2003). Thus, these networks are often created for limited duration and dissolved at a certain date or after reaching the previously set goal. However, organizations as well as individuals very often work together repeatedly in changing constellations that are adjusted to the requirements of the projects.

Being goal directed and producing important outcomes such as health services or innovative products, issues central to the functioning of formal organizations such as performance, governance and control have become central issues for networks. In 1990, Powell wrote that networks, being neither markets nor hierarchies "are lighter on their feet" than hierarchies. Given this starting

Figure 2
Different Forms of Governance
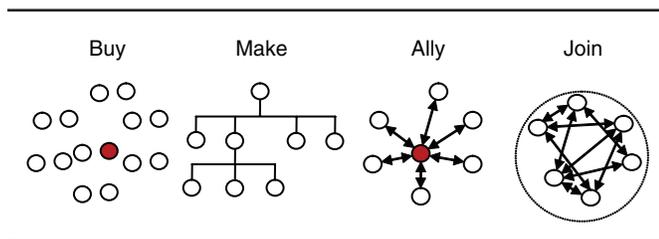
point, the discussion on networks has to date mainly focused on networks as a form of governance in comparison with markets and hierarchies but paid very little attention to the fact that networks come in various forms and shapes, are governed quite differently (Provan & Kenis, 2008) and despite being different from hierarchies nonetheless need a control function to be effective (van Raaij, 2006). Therefore, besides the classical three forms that are connected to the strategic choice whether to 'buy,' 'make' or 'ally,' we now have to pay attention to the strategic choice 'join' (i.e. form whole networks as joint production systems) (Provan, 1993; see Figure 2)

Given the enormous importance of 'ally' and 'join' for the performance and survival of organizations but at the same time the very high failure rate of alliances, it is no surprise that organizations have become much more diligent in choosing new partners and put an increasing emphasis on alliance management (Spekman et al., 1998).

As with all dynamic transformation processes, various developments are not necessarily consistent but often contradictory and some features of new forms of social organizations evolve earlier than others. Moreover, some countries or sectors might be frontrunners while others follow only many decades later. We therefore do not claim that the development of "networks für sich" only started in the year 2000 or might even be in full swing in the year 2010 (Miles, Miles, & Snow, 2005, p. 3). Actually, we can see the development of interorganizational networks already for some time for example in the Japanese industry (Keiretsu) or in construction where modularly organized consortia have been around for decades while in the U.S. for example interorganizational networks only became a legitimized form of organization during the 1990s (Human & Provan, 2000, pp. 337-338).[8]

As argued above, the majority of organizations in the 18th and 19th century can be classified as "organizations an sich." Manufacturing organizations were organized around an individual entrepreneur for whom people worked on an occasional basis. The socioeconomic differences between the capital owners and the employees

were simply too big in order for a common organizational identity to evolve. This changed fundamentally at the end of the 19th and the beginning of the 20th century, in which especially private organizations massively developed into formally juridical persons, i.e. were incorporated, in many Western countries with which the employees identified. Since manufacturing companies depended exclusively on an entrepreneur, the time horizon of existence usually was his lifetime with a possible successor. This changed fundamentally in the 20th century when with the development of the managerial class and being a formal juridical person, the time horizon of existence was extended to potentially unlimited.

The development of formal hierarchical organizations as separate legal entities (corporations) stretched over several centuries until they became the dominant organizational form in the 20th century both in the private and the public sector. While churches and local governments had already become incorporated during the Middle Ages, the first important private corporations appeared in the 17th century in the form of colonial corporations like the Dutch East India Company. However, it was only at the end of the 19th century when the institute of limited liability, deregulation and the emergence of capital markets merged to give birth to the modern corporation. Thus, also the development of corporations stretched over several centuries progressing very differently in various sectors and countries.

If we look at the development of organizational forms and their characteristics over the last 200-300 years we can observe that the previously dominant organizational form is never entirely substituted by the newly emerging one, rather, organizational forms are subsequently put on top of each other, which leads to an accumulation of, but also represents a reaction to increasing complexity. Today, there are still individual entrepreneurs, but also formal organizations, and increasingly networks and currently we know two types of legal persons, individuals and juridical persons (formal organizations). As organizations massively became separate legal entities in the 19th and early 20th century in order to cope with the fact that they produced outcomes and had increasing capital requirements that could or should not be attached to any single person, the question with regard to networks, we are currently facing is, if and when they will receive a legal personality that would be liable toward customers and clients as a whole (Teubner, 1993). The Dutch ministry of Health, Welfare and Sport for example recently formulated patient rights in Health Care in a memo to the Dutch parliament[9] among which they also stated a "right that health care providers have to coordinate" which points in the direction of a joint responsibility that

could eventually culminate in a joint liability attached to a new legal entity.

Theoretical and Methodological Developments

The social sciences followed suit to these empirical developments by adding new units of analysis. While scholars like Durkheim, Simmel and Tönnies analyzed societies as collectives of individuals and families, subsequent scholars like Weber, Perrow, and Simon focused on organizations as the unit of analysis. With Castells, Wellman and Watts networks as emergent systems became the new unit of analysis in the 1990s and we argue that networks as consciously created organizational system will receive more and more attention in the coming years. As for the development of the organizational forms, where additional layers were added over time, we can observe a similar pattern for the development of the units of analysis in research. For the development of the unit of analysis we also see that new units of analysis appear but that they do not entirely replace the ones that previously were at the center of attention. The new unit of analysis is simply added. The previous ones might therefore get less attention but are still relevant and eventually are combined in a multilevel analysis. Scholars in the social sciences nowadays analyze individuals, organizations, networks as emergent systems and increasingly also whole goal directed networks. However, there remains still a lot to be done to understand the many complex interactions between these levels (Ibarra, Kilduff, & Tsai, 2005). In fact, methodologically we have not grasped yet the consequences of adding the network level in the analysis of organization behavior.

With regard to methods we can observe an increasing sophistication and broadening of the methods spectrum over time. While the early sociological scholars based their studies on individual observations and theoretical reasoning, social scientists studying organizations in the 20th century applied more and more systematic data collection procedures and advanced statistical tools to analyze attribute data. With the rise of the network society the development of quantitative network analysis accelerated which has now found its way into mainstream analysis in the social sciences. The decisive shift that hereby occurred is from a focus on attributes to a focus on relationships between social entities that form serendipitous networks. For the analysis of whole networks, quantitative network analysis is still needed but not to determine positions of individual actors or learn more about their dyadic relationships but to determine the network characteristics as attributes of networks.
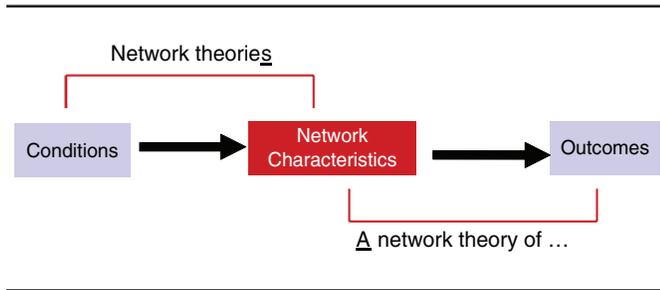
Figure 3
Year and Percentage of Total Publications Web of Science 1988-2008: Inter-organisational network in topic (571 hits retrieved June 27, 2008)
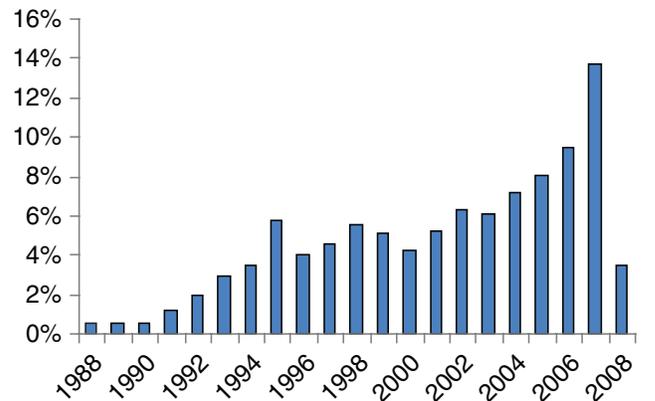
As the units of analysis and the methods changed so did the theoretical focus. The 19th century witnessed the development of general sociological theory and sociology as a scientific discipline in which the analysis of social organization was embedded. After the rise of organizations, organization theory started to emerge with scientific management, bureaucratic theory and in the second half of the 20th century with contingency and neo-institutional theory. Starting in the late 1970s and 1980s, transaction cost theory and resource dependence theory emerged and became more and more prominent in the scientific discourse. The latter two theories focus on the dyadic relationships between two organizations, which was very appropriate, given the empirical developments at the time. If our assumption is correct that we are on the eve of the age of goal-directed networks, we need to focus now on the development of network theorizing.

If we look at the development of research on interorganizational networks that was published in English as depicted in Figure 3, one can observe that in terms of number of publications in ISI journals, research really took off in the early and mid-1990s but shows exponential growth since 2000 with an absolute peak in 2007. It therefore seems that more and more attention and resources are devoted to research on interorganizational networks. However, we cannot determine from this simple count, to what extent the research is actually on goal-directed networks. In fact, in a recent review, Provan et al. (2007) found only 26 empirical studies with network being the unit of analysis. What a network theory in this respect should entail and what has already been

Figure 4
Network Theory

Figure 5
Special Research Forum on Building Effective Networks (D.J. Brass, J. Galaskiewicz, et al. [eds] *The Academy of Management Journal*, **2004)**
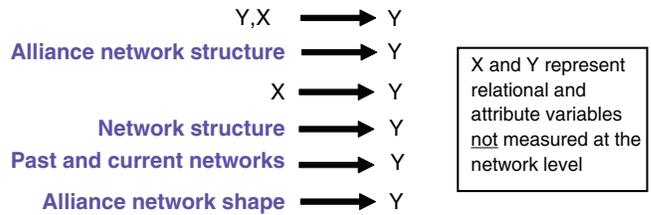

Figure 6
Special Topic Forum on Building Effective Networks (Parkhe et al. [eds] The Academy of Management Review, 2006)

achieved in the area of whole networks will be the focus of the second part of this essay.

The State of Network Theory

When reading the organization studies and management literature one often comes across the term "network theory." In 1995, Salancik wrote a critical essay in the fortieth anniversary issue of Administrative Science Quarterly about the state of network theory. In this essay, he claimed that network studies had failed so far to develop a generic network theory of organizations, i.e. a theory that explains the structure, development, strategies, behavior, failure, etc. of organizations with network characteristics. Up to that point, Salancik argued, network analysis as a method had made great progress but was mainly used to test hypothesis derived from other organization theories like resource dependence theory or transaction cost theory. Borgatti and Foster (2003) answered Salancik's criticism and claimed that network theories emerged in many areas of organizational scholarship. So the question arises who is right today especially with regard to whole networks. Looking at the literature that claims to develop network theory, one can distinguish on the one hand between theories that explain characteristics of networks, thus using "network" as the dependent variable. On the other hand we find theories that use network characteristics to explain all sorts of social phenomena and outcomes (see Figure 4), thus "network" serving as the independent variable. We suggest to use the term "network theories" for theories that use network characteristics as the dependent variable, i.e. that explain the coming into being, the structure and dissolution of networks. Theories that use the network as the independent variable usually take a relational perspective in the explanation of specific social, political or organizational phenomena that are also commonly explained by other theories such as effectiveness, leadership,
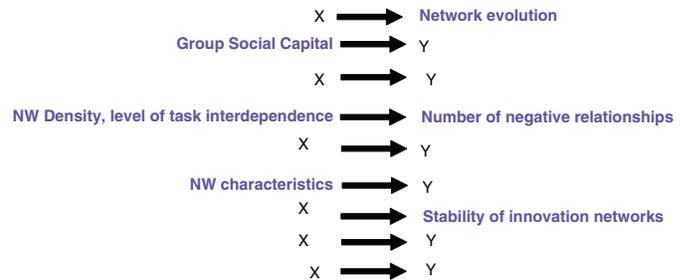
job performance, policy making, etc. In this instance we should talk about a "network theory of . . ." instead of "network theories" to indicate that network is actually the independent variable.

In order to get an insight where the focus of current research is in terms of unit of analysis and whole network as a dependent or an independent variable, we conducted an analysis of the two most recent special issues of the Academy of Management on networks. In Figures 5 and 6 we depict the analysis of the articles published in the Academy of Management Journal in 2004 *(Special Research Forum on Building Effective Networks)* and the Academy of Management Review *(Special Topic Forum on Building Effective Networks)* published in 2006. Interestingly, but not surprisingly, the majority of contributions used network as the independent variable (bold gray letters in Figures 5 and 6) although both titles of the special issues would suggest networks to be the dependent variable. Looking at the articles in the 2004 AMJ Research Forum, we find first, that quite a few studies have the dyad as the unit of analysis. Second, in all but one case, the dependent

variable comes from other fields in management and organization studies. The articles therefore mainly contribute to a network theory of Y. One reason, we believe for this picture is the difficulty of conducting network research with the unit of analysis being the network. As Provan et al. (2007) have found, most whole network studies have a rather low number of cases. Since, it is very time-consuming and risky to collect whole network data, scholars tend to refrain from studies, where the scores and variation of the dependent variable is known very late in the research process.

This assessment is confirmed by looking at the articles published in the special issue on "Building Effective Networks" in the Academy of Management Review in 2006 (see Figure 6). Here we can see that in three out of nine contributions, network characteristics are the dependent variable. Although these two special issues of the Academy do not statistically represent the field of network research, we assume that they nonetheless show some of the best and most advanced research in this area. It therefore seems that in network theorizing with network as the dependent variable research has somewhat progressed between 2004 and 2006. Despite this progress, it is however, still somewhat surprising that in two special issues with the focus on "Building Effective Networks," there is relatively little research on whole networks and independent variables that would explain the formation, development and functioning of effective networks, i.e. explore and test network theories (see also Galaskiewicz, 2007).

Analyzing the body of research that exists on interorganizational research we conclude the following:

1. There has been an enormous growth in applying a network framework in the analysis of organizational problems and phenomena.
2. We have seen a large increase of research on interorganizational networks and considerable progress in the development of various network theories of Y, in which network is the independent variable, using a relational perspective to explain a great variety of political, social and political phenomena such as innovation, entrepreneurship, effectiveness or team performance. However, the unit of analysis is often the dyadic relationship and not the whole network.
3. There has been relatively little (empirical) research to date to develop network theories with the network as the dependent variable, especially when it comes to whole networks.

In the following we discuss, what we think is needed in order to further develop network theories, i.e. theories with the network as the unit of analysis and as the <u>dependent</u> variable, that would explain the coming into being, functioning, structure, development, governance and norms in interorganizational whole networks, since as we have shown, it is in this area where we know the least so far.

Research challenges

We believe four features to be important for theory development in this regard (see Whetten [1989] for a well crafted argument on what constitutes a theoretical contribution). First, network should be considered as a distinctive form of organizing and as a variable. Especially important, network and not dyadic relations should be the unit of analysis ('what'). Second, theories should clearly state the relationship between the independent and network as the dependent variable ('how'). Third, the theories should be able to convincingly argue why there is a relationship between the independent and the network as the dependent variable ('why') and fourth, the theories should clearly state the limitations to external validity, i.e. 'where,' 'when' and 'for whom' are they valid. As can be seen in the following section, we have considerable knowledge about the "what," but the body of knowledge becomes increasingly smaller with each step along Whetten's four categories of theory building.

Whole Networks as a Distinctive Form of Organizing and as a Dependent Variable

An important condition for network theories to develop is that networks are considered as a distinctive form of social organization. However, as Borgatti and Foster (2003) stated, "while there is general agreement on the benefits of this new organizational form, its ontological status remains somewhat unclear" (995). As argued above, we therefore need first to distinguish networks theoretically and empirically from formal organizations (i.e. network should be the unit of analysis) and second we need to distinguish between "networks an sich," i.e. network as an emergent social system and "networks für sich," i.e. networks as consciously created forms of social organization whose members strive to achieve common goals. Therefore studies that use network as an empirical tool (quantitative network analysis) or as social structure do not contribute to the development of network theories as understood here. For example the

excellent study by Padgett and Ansell (1993) on the rise of the Medici use "network" to describe and to characterize a specific type of social structure. However, Padgett and Ansell do not contribute to the development of network theories as defined here (which was also not their intention) but rather attempt to explain the rise of a family clan and to contribute to a network theory of state formation.

One could, however, argue that in empirical reality the boundaries between whole goal directed and emergent networks are not that clear-cut. We also think that the transition from network as mere social structure, as serendipitous networks (network in itself) to goal directed whole networks (network for itself) can be fluid and that it might be difficult to exactly determine the nature of the network. Here, a network for itself will develop out of a network in itself over time as the group of organizations originally bound together merely by separate dyadic relationships starts to develop a collective identity or discovers a joint interest (unplanned evolution). In fact, looking at the relatively few studies that deal with the development of whole networks (see for example Baum & Ingram, 2002; D'Aunno & Zuckerman, 1987; Human & Provan, 2000; Sydow, 2004) one could conclude that this is the most prominent way. On the one hand, this might be a longer process that leads to an acknowledgment of the actors that they belong to the same social system. It could, on the other hand, also happen relatively quickly by the occurrence of an outside threat. For example the threat of government intervention in a certain sector might suddenly lead to a transition from a network in itself into a network for itself, as the companies get organized, rally behind a common goal and set up a federation to avert the government intervention. Sydow (2004) by contrast reports a case, in which changing market conditions through liberalization brought organizations that had dyadic contacts together to form a whole network to deal with the new market situation.

However, one could also think of a situation, in which one organization or an external party like a government agency is confronted with a problem or wants to realize a goal, which it believes can only be tackled or achieved by forming an interorganizational network (van Raaij, 2006). A whole network is thus created from scratch by conscious design more in a top down way. The organizations will then go through a decision and selection process of potential parties and invite the chosen organizations to participate. Naturally as with all decision processes, also partner selection is subject to bounded rationality, i.e. the search will be restricted to a limited amount of organizations and terminated after a predefined satisfactory level has been achieved. This is especially the case in the instance of ephemeral temporary networks which are set up on very short notice to quickly respond to an unforeseen problem, like managing a disaster. Another possible pattern of network formation could be called "sequential recognition." Here, the initiative initially rests with one organization, which will select a second one, which will over time bring in partners they have worked with before as the need arises.

Since these are ideal typical processes, one will find mixed types in empirical reality. For example in order to deal with bounded rationality and information asymmetries in the case of conscious design, the initiating organization might revert to prior ties (Gulati and Gargiulo, 1999) or consult the first chosen organizations on further candidates.

However, in all three cases, once the network reaches maturity, it will show some sort of collective network identity, the minimum of which is a conscious mutual recognition about which organizations are part of the network. In addition, D'Aunno and Zuckerman (1987) state that the key factors for the transition from an emergent state to a network for itself (they call it federation) is the motivation of the participating organizations to achieve network goals and their increased dependence on the network for valued resources. Thus, the strategic focus of the organization switches from dyadic alliances to the network as a whole.

When developing network theories with regard to whole networks, the network (and not relations) should therefore be the unit of analysis. It seems, however, not to be the case for most so-called "network theories" that scholars refer to in the literature such as balance theory, homophily theory, transaction cost theory or resource dependence theory. In all these theories dyadic relations form the dependent variables and should therefore rather be labeled as relational theories.

Likewise, if we want to develop network theories, the dependent variable should not be the individual organization but the network. For example Owen-Smith and Powell (2004) in their impressive work on the Boston Biotechnology Community try to explain the innovation of individual organizations by organizational characteristics operationalized in network analytic terms. Their contribution is thus primarily to a network theory of innovation or organization but not to network theories where network is the dependent variable.

If we are interested in networks as the dependent or independent variable, there should be variation. The most frequently used, most advanced and most elegant

Figure 7
Three Governance Forms of Whole Networks
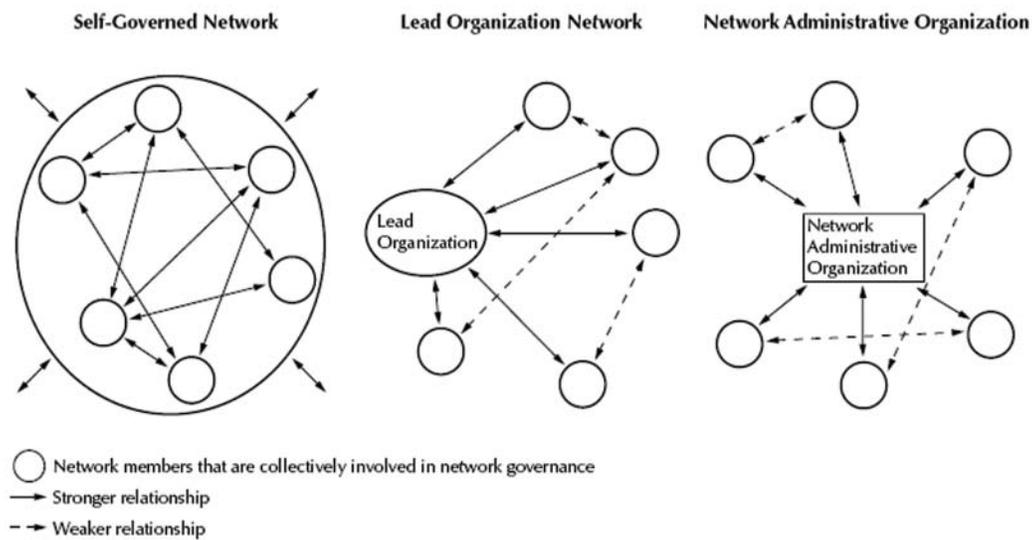
perspective to date is to look at various structural characteristics of networks that can be analyzed with quantitative network analysis in order to determine different network characteristics like density, clustering, centralization, etc. However, when treating network as a distinctive form of organizing one could also distinguish different forms of networks as for example Mintzberg (1979) has done for organizations. Provan and Kenis (2008) recently suggested to distinguish three different governance types of networks: the self governed network, the lead organization network and the network governed by a network administrative organization (NAO, see Figure 7 below), hereby introducing the governance type of whole networks as a nominal level variable.

Promising Independent Variables for the Development of Whole Network Theories

Since the seminal article by Provan and Milward in 1995 titled *A Preliminary Theory of Network Effectiveness*, we have seen only a few empirical studies with a comparative case study design that look at the effectiveness of networks. Methodological and data collection problems have prevented us so far from conducting systematic comparative case studies with a larger N in order to come to more generalizable results and make progress in developing theories to explain network effectiveness. Related to the question of effectiveness is the issue of control. While there is considerable work on control in

general, we do not know yet to what extent which control mechanisms are applied in networks in which circumstances and with what effects. Recently, Kenis and Provan (2006) argued, that the defining type of control for networks is "reputational control," i.e. the commitment and quality of contributions of participating actors is checked by the fact that their reputation would decrease considerably and therefore would make involvement in the future less likely, if they did not live up to the expected standard. With regard to whole networks, van Raaij (2006) showed that especially networks that are formed bottom up can develop effective control procedures to monitor and adjust their performance. These studies, however, are just the beginning and need to be further expanded and validated. In addition, from the general discussion on collective entities be it groups or whole societies we know that collectivities can only be successful if collective goods are produced that form an infrastructure that can be used for individual and collective purposes. The nature of these goods is that members within the group cannot be excluded from using them, thus there are in principle no individual rational incentives to produce them. Nonetheless, we believe that the existence of whole networks points to the fact that something is produced by the network which no single participating organization could be doing on its own and that therefore also collective goods are produced at least for the network members. The interesting question in our view is then what these collective goods are, how they are produced and how they are funded.

As argued in part 1 of this essay, currently many of these networks are of a temporary nature, i.e. their duration is limited from the outset defined either by a specific time span or by a condition or task that is to be reached or achieved. In the research on networks (contrary to the literature on projects), however, the question of temporariness as limited duration has played a very small role so far (see for an exception Jones & Lichtenstein, 2008). One could in this regard think of investigating which role temporariness plays as an intervening variable, moderating the relationship between certain conditions and the characteristics of networks.

In developing network theories there is some work for example in applying institutional theory to explain network development and network success (Human & Provan, 2000) or to apply contingency theory to explain size, type and the structure of networks. However, we have not yet systematically investigated the array of independent variables that are used for the explanation of characteristics of formal organizations to explain network characteristics and outcomes. We especially have not sufficiently discussed the question to what extent these variables and their underlying theories can be used or have to be modified to become network theories. One could of course also think about developing theories that are specifically designed to explain the development of networks as recently done by Provan and Kenis (2008). They suggest using the density of trust relations and the level of goal consensus between the network partners as independent variables to explain the specific form an effective network will take.

Although the research also on whole networks moves more and more toward a dynamic perspective, in which researchers collect data for at least two points in time, progress in this respect has been made mainly with regard to methodological and technical questions. We are now able to analyze longitudinal network data with quite sophisticated methods and computer programs. However, much less has been achieved in the area of network processes that would allow us to answer questions like how do whole networks actually develop; do they all follow similar life cycles; how are feedback and control process organized, etc.? What we would need, is a process perspective on whole networks as developed by Ring and van de Ven (1994) for interorganizational relationships.

Possible Theories of Action ('why')

Since, as we argued above, we are only at the beginning of developing network theories with regard to whole networks it is not surprising that there is hardly any systematic work in this area yet that would tackle the 'why' question. What we have as shown above are (theoretical) relationships between different variables. What is largely still lacking is to systematically connect these variables through (various) theories of action, i.e. to demonstrate how the dependent variable is influenced by the independent variables through actions by organizations or individuals. Some promising attempts in this direction have been made, however, for example by Baum and Ingram (2002), who introduce an evolutionary model of network formation based on imitation and learning of firms. Mayntz (1993), on the other hand, argued that while the emergence of interorganizational networks appears to be a core feature of societal modernization, their functional logic is bargaining and exchange. Thus, a theory of action would have to be developed on the basis of these action imperatives. Yet another promising start in this direction has been made by Jones, Hesterly, and Borgatti (1997) who base their "theory of network governance" ultimately on the rational choice paradigm, i.e. network governance comes about through the conscious rational decisions of individual actors, who maximize their utilities in specific exchange situations. In an excellent analysis of the most prominent network studies in sociology at the time, Emirbayer and Goodwin (1994) come to criticize the inadequate conceptualization of human agency in this field which we believe is still largely the case also in the field of interorganizational networks. They suggest that, in order to further advance the field, human agency should be included by focusing on the actors' identities which are culturally and normatively, as well as socially determined (Emirbayer & Goodwin, 1994, p. 1446). For whole networks this would mean that in order to explain network effects we have to pay attention to the actions and choices of individual actors that are based on the cultural norms of professions and sectors these actors are embedded in.

Defining and Enhancing External Validity

From looking at the literature on whole networks, it is our impression, that the large majority of scholars who publish in English in this area and are thus contributing to international mainstream theory building are overwhelmingly from Europe and North America conducting studies in these two continents. External validity is thus likely to be very limited. What we would first need is to try and replicate studies in different countries in these two continents and then subsequently engage in comparative work studying whole networks in other geographical areas like Asia or even transnational whole networks as

well. In addition, as recently argued by Berghoff and Sydow (2007), it would be warranted to engage more in comparative historical studies to better trace and understand the development of this organizational form.

Conclusion

After almost two decades of network research we can conclude that considerable progress has been made in many areas. However, the ontological status of "network" is still unclear. We hope we were able to contribute in clarifying this concept by focusing on the empirical and theoretical developments with regard to consciously created, goal directed whole networks. To distinguish different perspectives on networks is not merely a semantic exercise. It guides attention for research and helps us to formulate the right questions, theorize in the right direction and test the most promising independent and dependent variables. We have argued that theorizing about whole networks is going to be increasingly important (Miles, Miles, & Snow, 2005, Prahalad & Ramaswamy, 2003, Sachs, 2008) as this form of organization becomes more and more prominent in many OECD countries. To investigate how prominent this form has already become in which sectors and which countries is a daunting but very interesting and relevant task. If successful, we could much better answer the question which institutional and contingency factors contribute to the (early) development of this organizational form which would in turn help us to better understand the rise of the society of networks.

Notes

1. Fortis, Royal Bank of Scotland and Bank Santander, BBC news, Monday, October 8, 2007, http://news.bbc.co.uk/2/hi/business/7033176.stm, retrieved July 30, 2008.

2. See Financial times, FT.com, http://www.ft.com/cms/s/0/615c039a-8dbf-11dd-83d5-0000779fd18c.html?nclick_check=1, retrieved September 30, 2008.

3. We thank our colleague Jac Geurts for directing our attention to this intriguing similarity.

4. Although the term "society of networks" has been used before (Mulgan & Briscoe, 1997), the authors mainly focus on connectedness as in the discussion of the rise of the network society.

5. The development from "networks an sich" to "networks für sich" is not only a historical one but can also take place in the evolutionary process of a single network as participants become aware over time that they are members of a collective entity and might then get organized, install and institutionalize a specific form of network governance. The same holds true for the evolution of formal hierarchical organizations (see for example Baum & Ingram, 2002).

6. This is very much in line what Max Weber (1972) has argued for the characteristics of authority relationships. In premodern societies,

authority relationships were personalized while modern societies are characterized by impersonal authority relationships.

7. In our view, this also holds true for individual members in organizations and their identity formation process.

8. The question then arises what theories could explain the earlier adoption of interorganizational networks as a new organizational form (we thank Candace Jones for this insight).

9. Memo for Dutch parliament "The seven rights of patients: Investing in provider-client relationships in health care," by Ministry of Health, Welfare and Sport ("Programma "Zeven rechten voor de client in de zorg: Investeren in de zorgrelatie," Ministerie van Volksgezondheid, Welzijn en Sport aan Tweede Kamer) spring 2008.

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