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# SONA: A relational methodology to identify structure in networks

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**Abstract:** The study of networks has been characterized by a dualism of methods. Researchers either use interpretive methods to explore the quality of social relations, or quantitative methods to assess the formal structure of network connectivity. However, because relational and structural characteristics of networks are interdependent, we present a method for Situational Organizational Network Analysis to overcome this dualism. In sequencing and integrating qualitative, quantitative and action research techniques, SONA is designed to help unveil authentic understandings of socially meaningful structure in compliance with research ethics. Drawing on a decade of research experience we describe the workings of this integrative method and elaborate on its valued-added compared to single methods. Building on selected applications, we demonstrate how the tailored use of SONA enhances cross-validation, supports original theory-building, and empowers reflexive transformative research.

**Keywords:** Social network analysis; organizational networks; research methodology; mixed-methods

## 1 Introduction

Social networks are sets of individual or collective actors who are interconnected by social relationships. The study of social networks figures prominently in a broader conceptual perspective of relational thinking in the social sciences (Bathelt/Glückler 2011; Emirbayer 1997; Fourcade 2007; Mische 2011; Powell/Dépelteau 2013). In economic geography, researchers have been making ample use of social networks to study such diverse phenomena as innovation, regional growth, governance, social support,

industrial clusters, global value chains, global cities, etc. (Balland et al. 2012; Broekel et al. 2014; Faulconbridge 2017; Giuliani et al. 2019; Glückler/Doreian 2016; Grabher 2006; Jones 2014; Murphy 2018; Ter Wal/Boschma 2009).

Within this emerging field of study, scholars have used interpretive methods to focus on the quality of social relations, their emergence and meanings in specific contexts, whereas others have used quantitative methods of social network analysis to assess formal patterns of relations in the structure of a network. One important lesson that Granovetter (1985) revealed in his conceptualization of embeddedness is that both relational as well as structural embeddedness are equally important and interrelated components, which only together help reveal authentic understandings of the underlying social reality. Relational embeddedness refers to the quality of relations among dyads of actors, whereas structural embeddedness refers to the formal structure of networks (Granovetter 1985; Uzzi 1997). However, in the face of a rapid development of formal network techniques, attempts to combine or integrate the formal structure with its relational meaning have been rare, with notable exceptions (Bellotti 2016; Berthod et al. 2017; Conti/Doreian 2010; Edelmann 2018; Williams/Shepherd 2017). To reconcile this dualism between interpretive and structural approaches, some researchers have called for alternative or “better” methods to systematically combine qualitative and quantitative techniques to gain reliable knowledge about the quality, the structure and the context of social and economic relationships (Crossley/Edwards 2016; Gondal/McLean 2013; Mische 2011; Pachucki/Breiger 2010).

In this paper, we propose the integrative research method of *Situational Organizational Network Analysis* (SONA) as a way to convert the structure-meaning dualism into a duality of meaningful structure. SONA aims to support two goals. First, it is designed to capture both, the quality of social interactions in its specific context (relational embeddedness), as well as the structure of the relations of the entire network (structural embeddedness). Second, SONA is designed to use each of the two components to interrogate the other for the inspiration of theory-building and the cross-validation of empirical findings. Being initially designed for the transformative research of organized business networks ten years ago (Glückler/

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Hammer 2011; 2012), we have extended the use of SONA to multiple other contexts, including intra-organizational networks as well as organizational fields and markets, and ranging from the local, regional and national to the global scale. In sequencing qualitative, quantitative and action research techniques, SONA combines methods to help unveil valid understandings of meaningful structure in compliance with research ethics. Here, our goal is to elaborate on three comparative virtues of SONA vis-à-vis either interpretative or structural methods. We draw on selected show cases to illustrate how using SONA enhances validation, supports original theory-building, and empowers reflexive transformative research.

In section 2, we briefly review some of the methodological challenges in social network research and elaborate on three conceptual criteria – connectivity, contextuality, and reflexivity as complementary requirements of a relational methodology. In section 3, we describe the details of the six-step methodology of SONA in compliance with the aforementioned criteria. In section 4, we illustrate how SONA enables researchers to enhance the validity of their findings, to build new theory, and to engage in transformative research. We conclude by discussing a few implications as well as challenges in the use of SONA in economic geography.

## 2 Toward a relational, contextual and reflexive research method

Large part of contemporary social network research rests on readily available secondary statistical data. Typical sources of relational statistics are, for instance, patent data to represent innovation and knowledge (Balland/Rigby 2017; Breschi/Lissoni 2009); interlocking boards of directors or advisors to represent power and influence (Bonacich/Roy 1986; Cardenas 2015); financial syndication in equity investments to represent risk strategies (Sorenson/Stuart 2001), supply chains (Turkina et al. 2016) or contractual agreements to represent strategic collaboration (Owen-Smith/Powell 2004). This formal network analysis enables almost complete coverage of a population, avoids the problem of ‘missing links’ in networks (Ter Wal/Boschma 2009) and thus captures the entire pattern of connectivity for a defined type of relationship.

However, there are limitations to this approach regarding the contextuality of meaning and the reflexivity vis-à-vis potentially performative impacts on the network actors. Not all patents, for instance, *mean* innovation (Griliches 1990), and the co-occurrence of subsidiaries in global

cities does not necessarily *mean* ‘command and control’ (Smith 2014). Together, these deficiencies put limits on the quality of representation of the underlying real networks and to the scope of interpretation of network analytical findings. Moreover, this type of network research happens independently of the observed network actors, without their consent or awareness. By not engaging with the study group, this research practice can hardly account or control for the performative impact of research findings on the field. The researcher and the actors under study remain separate, the researcher being an invisible observer who investigates a supposedly objective subject. Therefore, we build a relational methodology that aims not only (i) to capture the structure of connectivity, but also (ii) to grasp the contextuality of the network as well as the meanings embedded in network interactions, and (iii) to engage with the field and its actors to support reflexive transformation. We briefly revisit each of these requirements:

*Connectivity.* We define a social network as a set of specific relationships between a certain number of individual or collective social actors under the particular assumption that the characteristics of these relationships as a whole can be used to interpret the actions of the actors (Mitchell 1969). A network analytical perspective is therefore interested in the connectivity of actors and the resulting opportunities for action and collective effects for the network as a whole. Consequently, empirical research needs to observe nodes (actors) and ties (social relations, interactions, or flows). Traditional research practice, however, often concentrated on the actors only, whereas the relations were at best observed through the lens of a few selected key informants. Such research left the actual structure of connectivity between the actors opaque or grossly aggregated. Coleman criticized such non-relational analysis of networks as “fragmented psychology” (Coleman 1958). The spread of methods of social network analysis has made it possible to visualize and analyze precisely these relation-level patterns of connectivity within and between organizations (Scott/Carrington 2011; Wasserman/Faust 1994). Connectivity, the pattern of social relations between a set of actors, is one prerequisite for building relational theory and for understanding the relational antecedents, dynamics and effects of social outcomes at all levels, the individual, the group, and the network as a whole.

*Contextuality.* Relational thinking is opposed to beliefs in deterministic formalism. Instead, formal network structures are often contingent and require contextual interpretation (Jones 2014; Yeung 2005). An understanding of the structure of a social network is contingent on the specific meaning of the social relations, and, conversely, has contingent social effects on the actors involved in a network

(Borgatti et al. 2009). Hence, formal analysis alone runs the risk of comparing apples and oranges when failing to grasp the socio-spatial context of the network as well as the specific meaning of the social relations. Structural embeddedness (Granovetter 1985), for instance, was found to be beneficial for firms in contexts of industrial emergence, whereas it was detrimental in contexts of declining industries (Rowley et al. 2000). Similarly, a network position of brokerage can play out very differently, depending on the social context as well as the people occupying these positions. A brokerage position can be exploited in different ways. Whereas a *tertius gaudens* strategy (Burt 1992) privatizes the benefits by taking advantage of a central position within otherwise disconnected actors, a *tertius iungens* strategy (Obstfeld 2005) socializes the benefits by establishing new linkages among so far disconnected actors to facilitate new collaboration. An integrative relational methodology aims to capture socio-spatial context, cultural framings and the particular social meanings of the interactions and relations that build the social network (Gondal/McLean 2013; Mische 2011; Pachucki/Breiger 2010).

*Reflexivity.* Network research is non-neutral (Scott 2015) but affects people in the field in at least two ways. First, new and previously unknown concepts discovered and developed in the course of research influence the behavior of people in the field once they become aware of these new insights. Findings of network research are always likely to have performative effects on the real world (Healy 2015). The performativity approach precisely explores the question of how scientific models do not describe or explain reality, but how they actually adapt reality to the model (Callon 1998). Take the example of the performative effect of the concept of structural holes (Burt 1992): A robust empirical finding from network research is the correlation between broker positions in networks and individual performance, positive evaluations, bonus payments and above-average salary development of managers in their peer group (Burt 2004). In the beginning, this correlation was unknown to managers, simply because the concept of structural holes was undiscovered. Through publications, lectures, and training, however, these findings increasingly penetrate the minds of managers and slowly become their calculus for strategic behavior (Cross 2009; Hall 2008; 2009).

Second, primary empirical research necessarily implies social interaction between the researcher and the field. Such intervention needs to be reflected by the researcher to understand how engaging in the field raises awareness, issues of confidentiality and potential conflicts of interest, e. g. if employee-conveyed information incurs

management decisions at the detriment of those who provided them. Hence, network researchers should be aware of the reflexivity of the research process, in which both researcher and actors in the field, mutually affect and are affected by each other. Due to the exchange of ideas, interactions within the field, and practices of sense-making, researchers are in a position to reflect their responsibility for collecting and processing observations as well as for interpreting and disseminating findings (Borgatti/Molina 2003; Tubaro 2019).

### 3 SONA: Situational Organizational Network Analysis

In response to the above discussion, we developed the relational methodology of *Situational Organizational Network Analysis*, originally in the context of organized business networks (Glückler/Hammer 2011; 2012). Rooted in a mixed-method approach, SONA rests on the intention to compensate for the blind spots of single methods and at the same time combine the advantages of the structural analysis of network form, the interpretive analysis of network content, and the reflexive-transformative engagement with the field. SONA includes six steps<sup>1</sup> for observing, analyzing and cross-validating observations of social networks (Table 1):

*Step 1: Preparatory interviews.* This first step provides the researcher with a complete picture of the whole network from an insider and leadership perspective. It helps to get a first understanding of its formal processes, its organization, types of relations as well as problems. The preparatory discussion helps to set the focus for the analysis. Key informants, e. g. executive management, spokespersons or credible experts serve as contact persons throughout the entire research process and usually act as central gatekeepers and multipliers. They assist in working out problems and questions within the network and help to identify the peculiarities of network relations.

*Step 2: In-depth interviews.* Qualitative, semi-structured interviews with network members help to discern the basic workings of a network, including an understanding of the members' motives and expectations, practices and incentives, and perspectives and previous experience of their engagement in the network. The interviews make it possible to grasp the contextuality of the network and thus

<sup>1</sup> A more detailed step-by-step description of how SONA gets implemented can be found in Glückler et al. (2012) and in an explanatory video (Kreanets 2016).

**Table 1:** The six steps of SONA

Steps	Tasks	Outcomes
Preparatory interviews	Framing and context: understanding nodes, ties, and challenges of an organizational network in its spatio-temporal context	Defined and agreed research problem, detected requirements, consent on the objectives
In-depth interviews	Semi-structured, qualitative interviews with network members on how to interpret the variety and meaning of activities and outcomes	Understanding of activities, valid measures of ties, and determined choice of observations required for the network survey and formal social network analysis
Network survey	Personalized invitations to take part in a primary network survey on all network members or participants	Relational dataset, including several types of ties and several arrays of a network ready for analysis
Visualization and social network analysis	Formal analysis of structural features at the level of nodes (people or organizations), subgroups (e. g. departments) and the network as a whole (positions, roles)	Network statistics at all levels (nodes, ties, subgroups, paths, whole network), and network models (e. g. blockmodels, ERGM, MRQAP) for theory-testing
Group discussion & Follow-up interviews	Discussion of findings with network members, follow-up interviews to reveal controversial issues and detect solutions	Communicative validation of findings, clarification of ambivalent interpretations, causal or impact assessment
Implementation support	Discuss appropriate objectives and potential fields of action	Recommendations and support for organizational change

serve as a starting point for the development of specific research questions and to design a tailored survey questionnaire in step 3. While the qualitative data collection supports the authenticity of the observations, qualitative content analysis is applied to start structuring the observations into concepts and categories. Together, the more explorative preparatory talks and the semi-structured in-depth interviews are useful to raise network members' awareness for and interest in their network, helps reduce reservations against the research team, enables close dialogue, and thus supports trust in the researcher and makes participation in the network survey more likely.

*Step 3: Network survey.* The first two steps of SONA provide the basic understanding necessary to specify the items of a network survey questionnaire that is fully tailored to the particular context of a network. Such tailoring of the instruments allows us to capture meaningful relationships for which secondary data oftentimes are not available. The survey questionnaire precisely collects information on different social and economic interactions and relations between the network members as well as their commitment to and their benefits from these activities. Thus, innovative cooperation does not only have to be expressed at the level of joint patent applications, investments or cooperation agreements but also, for example, in interpersonal knowledge sharing, project work, etc. The survey also includes socio-demographic and personal attributes. Often small details are important for getting valid representations of an empirical relationship. Knowledge sharing takes place not only in contractual coop-

erative relationships but also in informal relationships between managers or employees, which are ultimately not available from standardized databases. In addition, people and organizations often establish different types of relationships in parallel. These hidden forms of cooperation can be uncovered through tailored network surveys<sup>2</sup>. Because missing data are hard to replace by estimation, it is crucial to convince members of the value of their participation to maximize response.

*Step 4: Visualization and social network analysis.* Methods of social network analysis are used to visualize and analyze the survey data, but eventually also include additional secondary data either provided by the organizations themselves, e. g. archival data on project teams, or through own media or document analysis. The analyses include assessments of actor *locations* in the network (e. g. centrality), of subgroups (e. g. clusters of actors), of functional *positions* (e. g. gatekeepers), as well as structural characteristics of the entire network, e. g. centralization, fragmentation, core-periphery structures, modularity, etc. (Borgatti et al. 2018; Doreian et al. 2005; Wasserman/Faust 1994). Moreover, network measures of both individual actors, as well as subgroups and the entire network, can be

<sup>2</sup> It is crucial to respect the privacy of the participants and to ensure confidentiality of all information. In large organizations, work councils request compliance with ethical standards of good scientific practice to grant their consent for conducting surveys. Therefore, it is essential to establish a data firewall between the research team and the study group. Data should be collected and processed exclusively on the servers of the research organization.

used for network models and statistical analysis to either explore relational patterns or to test propositions that have come up from theory and/or during the qualitative steps one and two of SONA. While the structural network analysis helps identify formal positions, the interpretation of actual meanings of these network measures can only be revealed in personal interviews with network members.

*Step 5: Group discussion and follow-up interviews.* Group discussions serve to present, jointly reflect and thus cross-validate the findings from the SNA together with the network members. If necessary, follow-up interviews with selected members can help resolve contradictions or clarify ambiguous interpretations. The combination of insider knowledge and interpretations of the members with the empirical observations and evaluations obtained by the researchers allows for communicative validation of the findings and thus adds to the internal validity of the interpretations. SONA thus promotes ‘reflection in action’ in two ways. Firstly, in combining and sequencing multiple steps of interaction, observation, and conversation, it stimulates continuous interpretation and reflection of the network members on interim results, follow-up questions and the interpretation of fields of action. Secondly, SONA has an activating effect on network members. Members are interviewed, participate in the development of questionnaires, receive visualizations of the cooperation landscapes in the network, interpret findings and are activated for interaction among each other in group discussions.

*Step 6: Implementation support.* Although SONA follows a sequential logic, follow-up interviews in stage 5 need not necessarily be the last step of the analysis. Sometimes these member checks trigger deliberations on how findings should become transformative to the improvement or further development of a network. At other times, they may provoke still new insights and trigger further rounds of interviews and even a new formal network analysis. In practice, for instance, it became apparent that the goals of individual members were not aligned with the collective goals of the network. This tension can be used as the starting point for conversation on consensual goals for a change process regarding the organizational design or the governance of a network. This final step includes elements of action research, which is sensitive to the fact that applications of research findings in organizations regularly lead to inappropriate effects (Susman/Evered 1978). Consequently, action research aims at “trying to change the system while at the same time generating critical knowledge about it” (Small 1995, 942). Action researchers reject the notion of objectivity and separation between the researcher and the actors under study, or the superiority of researcher knowledge over the knowledge of people

in practice. In the case of transformation, the network researcher may decide to discuss eventual development goals and, critically assert and advise on appropriate actions, or even assist in implementing interventions to support organizational change. All steps of SONA have the potential to confront a researcher with unexpected results, which renders the methodology open for empirical and conceptual discovery. New insights, refutations of held expectations may all lead the researcher to revise and evolve research questions, analytical expectations, contextual understandings and transformative objectives.

## 4 How SONA fills the blind spots of single methods

We first applied SONA to the study of organized business networks, including over 300 business organizations, of which 233 responded to network surveys and many also took part in interviews at all steps of the SONA process (Glückler et al. 2012). Based on this experience, we extended the scope of this method and applied SONA on both, the micro-level of intra-organizational networks, as well as on the macro-level of organizational fields at regional, national and global scales (Table 2). In this section, we build on research experience on the micro, meso, and macro levels of applications to elaborate on three distinctive virtues of SONA when compared to single methods of either formal or interpretative network studies. Using SONA helps (i) to enhance the validity of findings, (ii) to inspire and build new theory in context, and (iii) to responsibly reflect the transformative impacts on the field of study.

### 4.1 Enhancing validity

The mixing of methods for the collection and processing of data offers many opportunities for substantive cross-validation. Whereas it is not uncommon to use multiple sources yet often of the same type of data in network analysis, with SONA we underline the importance of using multiple methods of data collection to grasp different types of qualitative and quantitative observations. We look at a few examples of how SONA allows researchers to scrutinize mistaken expectations, propositions, and interim findings and to capture meaningful network structure more rigorously. We distinguish between false expectations about empirical *referents*, about conceptual *references*, and about theoretical *rationales* of the underlying logics or meanings of a network (Figure 1).

**Table 2:** Applications of SONA on different organizational and spatial scales, 2010–2020

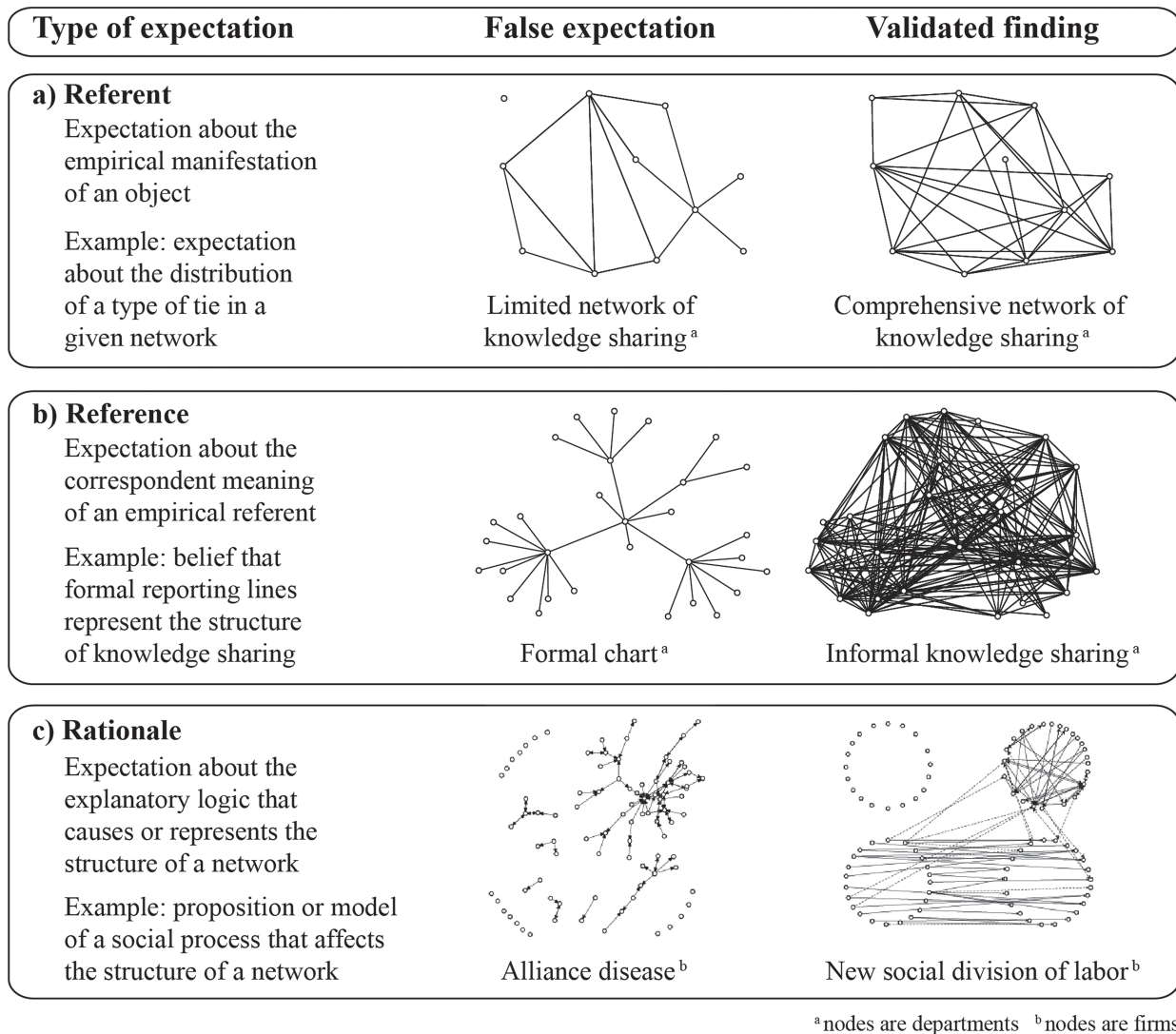
Case	<i>n</i>	Industry	Types of tie
<b>Intra-organizational Networks</b>			
BASF Argentina	224	Chemical	Knowledge sharing
Software Argentina	237	Software	Knowledge sharing
Chemical Germany	214	Chemical	Knowledge sharing
Katalux	171	Medical Tech.	Knowledge sharing, political support
ChemIC	41	Consulting	Knowledge sharing, collaboration
Student consultancy	46	Consulting	Knowledge sharing, collaboration
InnoScout	431	Chemical	Knowledge sharing, opportunity creating, financial support
<b>Organized Networks</b>			
Dentis	20	Medical Tech.	Knowledge sharing, authority-delegation, collaboration
RegioConsult	19	Consulting	Knowledge sharing, authority-delegation
Comra.de	20	E-Commerce	Knowledge sharing authority-delegation, collaboration
ZWÄG	42	Health	Medical treatment, resource-sharing
Forum Z	62	Waste Disposal	Knowledge sharing
GKT	43	Health	medical treatment, resource sharing
GlasTEC	95	Glass	Knowledge sharing, authority-delegation, collaboration
<b>Organizational fields</b>			
Regional scale: philanthropy	145	Private, civic & public	Donations, advisory board interlocks
National scale: photography	89	Creative	Contractual partnerships
Global scale: photography	378	Creative	Contractual partnerships

The first source of potentially false expectations is the perception that network actors have of the empirical *referent* or object of study, i. e. the social network. In the case of *Katalux* (Glückler/Panitz 2014), we first sought the view of the management in SONA step 2 on how knowledge would be shared across the organization according to their opinion. In step 4, however, the social network analysis revealed a markedly different and hardly correlated network structure. Only 29 percent of all ties among the employees followed the logic of connectivity drawn down on paper by the management in step 2 (Figure 1a).

A second frequently observed misperception in organizational network studies addresses the appropriate *reference*, i. e. the meaning of the observed referent. Management typically expects knowledge to be shared along the reporting lines of the organizational chart and workflows, whereas employees often create ‘companies behind the chart’ (Krackhardt/Hanson 1993) to seek professional advice, information and support through informal relations that cut across functional divisions of labor. In the case of *Katalux*, the formal network of reporting lines and departmental divisions was only weakly correlated with the informal network of knowledge sharing (Figure 1b). Such discrepancy between member expectations – who are often quite confident about knowing their organizational relations – and the collective survey of interpersonal relations between the employees is staggering and occurred

in most of our organizational case studies. Such cross-validation helps sensitize managers for their incomplete understanding of communication and interactions across the organization. Once being discussed in follow-up interviews and group discussions (step 5), findings that contradicted taken-for-granted expectations facilitated new dialogue and a rethinking of how legitimate organizational change could be supported. In this case, SONA helped us disclose how an intended transformation from technology to market orientation actually spread through the informal channels of interpersonal knowledge-sharing rather than formal reporting lines. Member checks with managers and employees supported open reflection and engaged conversation about how organizational change could not be commanded through the organizational chart but required more open and trustful communication to convince rather than command new organizational values and routines.

A third type of cross-validation that SONA supports is to reveal misguided *rationales* of accounting for an empirical phenomenon (Figure 1c). A crucial difference between SONA and other mixed-method approaches is that it adjusts the research process to the discovery of the association between the structure of a network and its underlying social process. In a study on the market for stock photography, a rapidly changing organizational field, the sequence of qualitative and quantitative methods combined with communicative validation helped to disprove



**Figure 1:** The virtue of cross-validation: Rejecting mistaken expectations

false expectations about the association between the observed network structures and the social process that produced this structure. What had happened? Having followed the recent evolution of the stock photo industry, we observed that photo agencies had unleashed an unprecedented boom of contractual sales partnership in the course of the digitization of photography since 2004. Simultaneously, the prices of digital photography continuously declined. Both, market participants and we as researchers initially interpreted the explosion in the number of sales alliances as a self-cannibalizing development leading to the duplication of content and a downward spiral in price competition. It took us several years of further research, including interviews, discussions (follow up) and a global network survey to understand the underlying relational process. Consecutive interviews with industry experts and the new method of generalized blockmodeling (Doreian et

al. 2005) helped us to pre-specify a new network model with a much better fit. Rather than reading the booming number of strategic partnerships as an ‘alliance disease’, we revealed the relational process to be the outcome of a deepening social and spatial division of labor, in which picture agencies specialized in either upstream activities outside the metro areas or in downstream activities in metropolitan regions (Glückler/Panitz 2016b). The discovery of this new insight into the nature of the evolution of the industry was neither the result of a single interview nor a sole network survey. Whereas individual interview partners could only offer insights into their own role in the network, we constantly compared the variation of individual views against the network structure and shared our network analysis with many experts before we finally understood the full picture.

## 4.2 Building theory

An opportunity that arises from enhanced cross-validation is the inspiration for original ideas and concepts. SONA is designed to capture organizational networks in a way that supports the discovery of new empirical and conceptual aspects. Similar to the discovery strategy used in case studies (Eisenhardt 1989; Eisenhardt/Graebner 2007) and grounded theory (Corbin/Strauss 1990; Suddaby 2006), SONA helps the researcher to pursue both, grasping the authenticity of a phenomenon and gradually engaging in the structuration of the observations into concepts, categories and new theory (Flick 2014). In our own empirical work, SONA has proved invaluable for building new concepts and theory in economic geography, including debates about controversial and peripheral innovation, temporary proximity, global value chains, and network governance.

How exactly does SONA support or inspire the process of theory-creation? The theory of relational upgrading, which aims to enhance our understanding of global value chains, may illustrate this opportunity (Glückler/Panitz 2016a). The key difference between relational and incumbent concepts of upgrading is the underlying mechanism that actually leads to reaping additional benefits in global value networks. The established view of upgrading rests on the proposition that firms and/or countries will upgrade their position if they manage to improve their products, functions or processes or if they expand to sell to different sectors (Humphrey/Schmitz 2002). Yet, the empirical evidence increasingly contradicted the notion that activity improvements suffice to gain upgrading benefits. In contrast, studies demonstrated that such improvements do not necessarily lead to economic benefits, and that might even lead to economic decline (Ouma 2010; Ponte/Ewert 2009; Tokatli 2013). Our research on the global stock photography market offered indications for a different mechanism, which we conceived as relational upgrading. Adopting a relational view, we re-conceptualized upgrading not as a consequence of nodal attributes (firm features or activities), but of the position in the pattern of connectivity that these nodes occupied. Hence, we developed a network model of upgrading and confirmed its empirical validity for the case of the stock photo industry. Positional changes in the global value network realized through the relational work of economic actors led them to increase their capture of value-added as well as to improvements of products, processes and business functions.

In retrospect, we were only able to discover and conceptualize this mechanism because of the combination

of case-sensitive primary observations of formal network structure with qualitative insights from hundreds of interviews. A global network survey (step 3), social network analysis (step 4) and follow-up interviews with business experts (step 5) were invaluable to discern the theory. First, the network survey was the most appropriate method of data collection to capture the contractual sales partnerships in the global industry. Although a lot has been written about positions in global value chains, hardly any study ever collected authentic data on inter-firm relations. Instead, they had either estimated these relations at aggregate industrial levels (international trade data) or focused on individual corporate cases, only. Instead, a network survey offered the opportunity to use the case-sensitive knowledge to analyze positional change over time and the underlying upgrading process. While in-depth interviews in SONA step 2 were helpful to tailor the survey questionnaire to the case, it was due to the follow-up interviews focusing on specific regional cases that finally sparked the notion of relational upgrading. A case study of Poland offered evidence and communicative validation for the history of positional changes of this market in the global market. It was not the improvement of an agency's product or process that explained the growth or decline of picture agencies but the growing connectivity with international picture and client portfolios of partner agencies that drove this upgrading. Qualitative and in-depth interviews in Poland inspired many details of the mechanism and thus provided the substantive meaning of relational upgrading as a general network process.

A second illustration of how SONA facilitates building theory from cases (Eisenhardt 1989) is the theory of peripheral innovation that was grounded on an in-depth analysis of the chemical corporation BASF in Argentina (Glückler 2014). First, intensive interviewing during SONA step 2 with employees ranging from managers to technicians, stimulated the rather loose idea of peripheral innovation. This idea got cross-validated in multiple other interviews yet was found unreported in official corporate documents. Further, interviews conveyed that the innovation had been vigorously resisted by the headquarter in Germany, yet it finally got developed and implemented at a client site in Argentina. These findings fueled the further conceptualization of controversial innovation. Without going beyond official documents and media reports – a claim that has been made for better case study research (Tokatli 2015) – the discovery would have been impossible. To elaborate on this validated incidence further into a theory, SONA steps 3 and 4 provided for the creation and analysis of a comprehensive network of knowledge sharing among employees. Drawing on hypothetical network simulation



studies (Krackhardt 1997), it was then possible to develop foundational propositions for the role of the periphery in devising and probing controversial innovations. In step 5, conversations with managers and employees not only helped validate the line of argument but also stimulated a local sense of innovativeness being valuable and feasible. In the contemporary academic debate about the relationship between innovation and the periphery, this new model of peripheral innovation has been acknowledged as a rare case in which the periphery is theorized as an opportunity rather than a legacy for innovation (Grabher 2018).

The sequencing of explorative and in-depth interviews, formal network surveys and analysis, communicative validation and reflection in action, facilitates a cyclical process of theorization and validation. Concepts such as the ‘rewiring’ of global networks in temporary events (Glückler/Panitz 2015; Panitz/Glückler 2017) or lateral network governance (Glückler 2020), also emanated from applying the sequencing process of SONA.

### 4.3 Reflexive transformation

A third virtue of SONA is that it supports the reflexive transformation of a network in a particular context. Network researchers should reflect their role as inescapably involved participants of real-world tensions in the field that they investigate (Borgatti/Molina 2003): because people necessarily have to name other people to indicate social relations, the data collection in network surveys can never proceed anonymously. It is therefore an ethical issue to anonymize all personal data immediately after their collection even within the research team<sup>3</sup> and to process data in ways that do not allow for the revelation of the identity of individuals in the social network analysis. Despite this clarification, we experienced situations right after the

<sup>3</sup> The European General Data Protection Regulation (GDPR) provides good guidance in this respect. Usually, data collection in traditional surveys is legally backed by a declaration of consent by the respondents. The specific challenge in network research is that the respondents identify and make statements about third parties who may not be aware of or agree to being named. This characteristic sets limits to the commercial application of network collection strategies. However, legal regulations allow the usage of third-party data for academic research purposes if there is no other possibility of collecting the data. If possible, those third parties should be informed about the fact that they were named by respondents. Furthermore, only personal data that are necessary for an analysis should be kept. In the case of network surveys, for example, clear names of third persons named by respondents should be anonymized before further processing the data.

survey in which the management carelessly asked about the identity of specific nodes (employees). These are decisive moments for researchers to withstand the call for disclosure and take ethical and data protection standards seriously.

With a decade of research experience, we often found that network actors have firm expectations about the shape of their knowledge network, whereas these expectations can actually be quite mistaken.<sup>4</sup> In this way, SONA helps sensitize network actors for the particular role of informal social networks ‘behind the organizational chart’ (Krackhardt/Hanson 1993), and for the unrecognized bottlenecks as well as opportunities to be realized from these insights. Studies using SONA have been transformative to the extent that they informed decision-makers about the reality of informal networks and thus created a deeper understanding of a variety of social and organizational mechanisms. At the same time, employees felt sensitized for the significance of their social relations, and they got mobilized to engage in conversation among each other and with the management. As researchers, we made sure that findings would not only be validated through member checks but that all findings were made equally accessible for all members of the organization (Tubaro 2019). Due to the close relationship between the observed organizations and us as the researchers we could take responsibility for how our findings were used.

The case of Dentis, a network of dental technology SMEs in Germany, demonstrates the extent to which research based on SONA becomes transformative. Through the exploratory and analytical steps 1 to 4 of SONA, we discovered that member firms regularly engaged in very different types of activities that differed substantially in participation, costs, and types of rewards. Whereas at the beginning network participants had a holistic view of their activities, the network survey conveyed that sharing costs of common resources and engaging in collective co-creation of new concepts and solutions had different implications for the distribution of inputs and rewards. During the member checks in step 5, conversations with the members elicited that the multilateral production of network goods<sup>5</sup> came with unequal contributions almost by necessity

<sup>4</sup> Although we have been engaged in transformative aspects of organizational change, we never took active or professional roles as consultants in organizational development. We did rarely propose concrete actions but explained the logic and potential conclusions of our research outcomes, such as the underlying network structures and their possible interpretations.

<sup>5</sup> A network good is a collective good whose consumption can be partially excluded and whose economic exploitation is congestible. In extension of the club theory, Glückler and Hammer (2015) conceive

because each member differs in the level and specialization of expertise, whereas collective outcomes should be shared equally among all members (Glückler/Hammer 2015). They discussed that their network would be obsolete if it only were a pool for bilateral business relations, and hence, decided to foster future engagement in collective projects and multilateral co-creation. In SONA step 6, the network spokespersons invited us to help devise useful interventions to stimulate the pursuit of network goods. These deliberations led to award a ‘network prize’ every year based on annual repetitions of the network survey. Over a period of four years, that our team conducted these network surveys, Dentis awarded this prize to the member who turned out to be most central in the network of collective knowledge creation. The prize was meant to be a reward and to incentivize a transformative process from an attitude of individual cost-avoidance to joint value creation. The transparency and inclusion that SONA offered, was key in enabling conversation, understanding and consensus on this transformation. However, this process was not uncontested. In the first year, only a small number of members favored collective co-creation over opportunistic networking. The plan to erect a ‘shared factory’ was upset by competitive rivalries and unresolved questions of participation and contributions. Yet when the fourth network prize was awarded a few years later, members not only reported collective creation of new knowledge and network goods as the most important goal of cooperation in the survey, but their activities in co-creation had also increased significantly together with a re-internalization of expensive service-contracts that had been outsourced a long time ago (Hammer, forthcoming).

## 5 Conclusion

SONA rests on conceptually justified and explicitly defined criteria – connectivity, contextuality, reflexivity, and it is designed for building empirically grounded and substantive understandings of networks. The sequencing of interpretative, analytical, and action research techniques enables researchers to fill the blind spots of a lack of contextuality in formalist and a lack of connectivity in interpretive network methods. Working through the six steps of SONA offers continuous opportunities for discovery, structuration, and validation as well as taking a reflexive role in engaging with and eventually transforming the field.

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network goods as specific club goods that are not only consumed in the club but also collectively created.

It has been the central goal in this article to demonstrate how SONA can be successfully used in such diverse contexts as intra-organizational networks, organized business networks, and organizational fields at all geographical scales from the local to the global. Acknowledging the growing connection between social network analysis and relational economic geography (Glückler/Doreian 2016; Murphy 2018), we believe that SONA offers valuable support for empirical research on contemporary debates about global value chains and supply networks, industrial clusters, the geography of innovation, global cities etc. SONA should be adjusted to the specific research context. Rather than completing steps of a determinate chain, SONA works best when understood as a flexible, cyclical and iterative process targeted to discovery, validation and understanding of meaningful network structure. In our experience, not the single change between two methods but repeated iterations between them conduce toward validation and new inspirations for theory building.

We are curious to learn about future applications and further development of this instrument by scholars interested in taking the methodological and empirical effort to bridge the structure-meaning divide currently bemoaned in relational thinking (Mische 2011; Pachucki/Breiger 2010). Of course, implementing this methodology comes with considerable costs in time and effort. It requires longer term engagement with a research topic, a requirement that runs against current trends and pressures to focus on research papers rather than more enduring research projects. It is therefore a challenging approach, with which we hope to contribute to the conversation about ‘making better methods’, which is at the heart of this special issue. Those being forced into rapid publication cycles to succeed in their academic careers will find it difficult to pursue the level of endurance, immersion and versatility of empirical analysis in early years.

Yet, as researchers will always be constraint by time, budget and field access, it is an advantage of SONA that it can be tailored to the scale and scope of resources available. Especially in small-scale applications, even a few in-depth interviews will prove valuable for capturing the context and diversity of meanings of a certain type of secondary data, e.g. patents, subsidiaries, financial transactions. Such combinations of methods help prevent researchers from tapping into the trap of misreading formal network structure or overinterpreting secondary data. And even if scholars feel that SONA be too demanding to use in a single project, they can deploy this method after repeated and ongoing research on the same topic to combine their multiple observations in a meta-analytic approach. Given SONA’s potential for enhancing validity, building theory,

and reflexive transformation we hope that users will find this method useful to devise relational research designs (Bathelt/Glückler 2018) and to study meaningful social and organizational networks.

## 6 References

- Balland, P.-A./De Vaan, M./Boschma, R. (2012): The dynamics of interfirm networks along the industry life cycle: The case of the global video game industry, 1987–2007. In: *Journal of Economic Geography*, 13, 741–765
- Balland, P.-A./Rigby, D. (2017): The geography of complex knowledge. In: *Economic Geography* 93, 1–23
- Bathelt, H./Glückler, J. (2003): Toward a relational economic geography. In: *Journal of Economic Geography* 3, 117–144
- Bathelt, H./Glückler, J. (2011): *The Relational Economy. Geographies of Knowing and Learning*. Oxford.
- Bathelt, H./Glückler, J. (2018): Relational research design in economic geography. In: Clark, G., Feldman, M., Gertler, M. S. and Wójcik, D. (Hrsg.): *The New Oxford Handbook of Economic Geography*. Oxford, 179–195
- Bellotti, E. (2016): Qualitative methods and visualizations in the study of friendship networks. In: *Sociological Research Online*, 198–216
- Berthod, O./Grothe-Hammer, M./Sydow, J. (2017): Network ethnography: a mixed-method approach for the study of practices in interorganizational settings. In: *Organizational Research Methods* 20, 299–323
- Bonacich, P./Roy, W. G. (1986): Centrality, dominance, and inter-organizational power in a network structure: interlocking directorates among American railroads, 1886–1905. In: *Journal of Mathematical Sociology* 12, 127–135
- Borgatti, S. P./Everett, M. G./Johnson, J. C. (2018): *Analyzing Social Networks*. London.
- Borgatti, S. P./Mehra, A./Brass, D./Labianca, G. (2009): Network analysis in the social sciences. In: *Science* 323, 892–895
- Borgatti, S. P./Molina, J. L. (2003): Ethical and strategic issues in organizational social network analysis. In: *Journal of Applied Behavioral Science* 39, 337–349
- Breschi, S./Lissoni, F. (2009): Mobility of skilled workers and co-invention networks: An anatomy of localized knowledge flows. In: *Journal of Economic Geography* 9, 439–468
- Broekel, T./Balland, P.-A./Burger, M./van Oort, F. (2014): Modeling knowledge networks in economic geography: a discussion of four methods. In: *The Annals of Regional Science* 53, 423–452
- Burt, R. S. (1992): *Structural Holes: The Social Structure of Competition*. Cambridge (MA), London.
- Burt, R. S. (2004): Structural holes and good ideas. In: *American Journal of Sociology* 110, 349–399
- Callon, M. (Hrsg.). (1998): *The Laws of the Markets*. Oxford.
- Cardenas, J. (2015): Are Latin America's corporate elites transnationally interconnected? A network analysis of interlocking directorates. In: *Global Networks* 15, 424–445
- Coleman, J. S. (1958): Relational analysis: The study of social organizations with survey methods. In: *Human Organization* 17, 28–36
- Conti, N./Doreian, P. (2010): Social network engineering and race in a police academy: a longitudinal analysis. In: *Social Networks* 32, 30–43
- Corbin, J./Strauss, A. (1990): Grounded theory research: Procedures, canons, and evaluative criteria. In: *Qualitative Sociology* 13, 3–21
- Cross, R. (2009): *Sample Personal Network Hardcopy Report*. Charlottesville, Virginia (USA): [http://www.robcross.org/network\\_software.htm](http://www.robcross.org/network_software.htm).
- Crossley, N./Edwards, G. (2016): Cases, mechanisms and the real: the theory and methodology of mixed-method social network analysis. In: *Sociological Research Online* 21, 217–285
- Doreian, P./Batagelj, V./Ferligoj, A. (2005): *Generalized Blockmodeling*. Cambridge (UK).
- Edelmann, A. (2018): Culturally meaningful networks: on the transition from military to civilian life in the United Kingdom. In: *Theory and Society* 47, 327–380
- Eisenhardt, K. M. (1989): Building theories from case study research. In: *Academy of Management Review* 14, 532–550
- Eisenhardt, K. M./Graebner, M. E. (2007): Theory building from cases: Opportunities and challenges. In: *Academy of Management Journal* 50, 25–32
- Emirbayer, M. (1997): Manifesto for a relational sociology. In: *American Journal of Sociology* 103, 281–317
- Erikson, E. (2013): Formalist and relationalist theory in social network analysis. In: *Sociological Theory* 31, 219–42
- Ettlinger, N. (2003): Cultural economic geography and a relational and microspace approach to trusts, rationalities, networks, and change in collaborative workplaces. In: *Journal of Economic Geography* 3, 145–72
- Faulconbridge, J. (2017): Relational geographies of knowledge and innovation. In: Bathelt, H., Cohendet, P., Henn, S. and Simon, L. (Hrsg.): *The Elgar Companion to Innovation and Knowledge Creation: A Multi-Disciplinary Approach*. Cheltenham, 671–683
- Flick, U. (2014): *The SAGE Handbook of Qualitative Data Analysis*. London.
- Fourcade, M. (2007): Theories of markets and theories of society. In: *American Behavioral Scientist* 50, 1015–1034
- Giuliani, E./Balland, P./Matta, A. (2019): Straining but not thriving: understanding network dynamics in underperforming industrial clusters. In: *Journal of Economic Geography* 19, 147–172
- Glückler, J. (2014): How controversial innovation succeeds in the periphery? A network perspective of BASF Argentina. In: *Journal of Economic Geography* 14, 903–927
- Glückler, J. (2020): Lateral network governance. In: Glückler, J., Herrigel, G. and Handke, M. (Hrsg.): *Knowledge for Governance*. Heidelberg, S.
- Glückler, J./Dehning, W./Janneck, M./Armbrüster, T. (Hrsg.). (2012): *Unternehmensnetzwerke. Architekturen, Strukturen und Strategien*. Heidelberg.
- Glückler, J./Doreian, P. (2016): Editorial: Social network analysis and economic geography – positional, evolutionary and multi-level approaches. In: *Journal of Economic Geography* 16, 1123–1134
- Glückler, J./Hammer, I. (2011): Situative Organisatorische Netzwerkanalyse. In: *Zeitschrift Führung und Organisation* 80, S. 379–386
- Glückler, J./Hammer, I. (2012): Situative Organisatorische Netzwerkanalyse. In: Glückler, J., Dehning, W., Janneck, M. and Armbrüster, T. (Hrsg.): *Unternehmensnetzwerke. Architekturen, Strukturen und Strategien*. Heidelberg, S. 73–93

- Glückler, J./Hammer, I. (2015): Cooperation gains and network goods. In: Jung, S., Krebs, P. and Teubner, G. (Hrsg.): *Business Networks Reloaded*. Surrey, UK, 22–41
- Glückler, J./Panitz, R. (2014): Command or conviction? Informal networks and the diffusion of controversial innovations. In: Berthoin-Antal, A., Meusburger, P. and Suarsana, L. (Hrsg.): *Learning Organizations: Extending the Field*. Berlin and Heidelberg, 49–67
- Glückler, J./Panitz, R. (2015): Beobachtung, Begegnung und Beziehung: Der Erwerb von Marktintelligenz in der globalen Agenturfotografie. In: *Zeitschrift für Wirtschaftsgeographie* 59, 20–33.
- Glückler, J./Panitz, R. (2016a): Relational upgrading in global value networks. In: *Journal of Economic Geography* 16, 1161–1185
- Glückler, J./Panitz, R. (2016b): Unpacking social divisions of labor in markets: Generalized blockmodeling and the network boom in stock photography. In: *Social Networks* 47, 156–166
- Gondal, N./McLean, P. D. (2013): Linking tie-meaning with network structure: Variable connotations of personal lending in a multiple-network ecology. In: *Poetics* 41, 122–150
- Grabher, G. (2006): Trading routes, bypasses, and risky intersections: Mapping the travels of ‘networks’ between economic sociology and economic geography. In: *Progress in Human Geography* 30, 163–189
- Grabher, G. (2018): Marginality as strategy: leveraging peripherality for creativity. In: *Environment and Planning A* 50, 1785–1794.
- Granovetter, M. (1985): Economic action and economic structure: The problem of embeddedness. In: *American Journal of Sociology* 91, 481–510
- Griliches, Z. (1990): Patent statistics as economic indicators: A survey. In: *Journal of Economic Literature* 28, 1661–1707
- Hall, S. (2008): Geographies of business education: MBA programmes, reflexive business schools and the cultural circuit of capital. In: *Transactions of the Institute of British Geographers* 33, 27–41
- Hall, S. (2009): Ecologies of business education and the geographies of knowledge. In: *Progress in Human Geography* 33, 599–618
- Hammer, I. (forthcoming): *Die Ökonomie organisierter Unternehmensnetzwerke*. Heidelberg.
- Healy, K. (2015): The performativity of networks. In: *European Journal of Sociology* 56, 175–205
- Humphrey, J./Schmitz, H. (2002): How does insertion in global value chains affect upgrading in industrial clusters? In: *Regional Studies* 36, 1017–1027
- Jones, A. (2014): Geographies of production I: Relationality revisited and the ‘practice shift’ in economic geography. In: *Progress in Human Geography* 38, 605–615
- Krackhardt, D. (1997): Organizational viscosity and diffusion of controversial innovations. In: *Journal of Mathematical Sociology* 22, 177–199
- Krackhardt, D./Hanson, J. (1993): Informal networks: The company behind the chart. In: *Harvard Business Review* 71, 104–111
- Kreanets. (2016): *Situative Organisatorische Netzwerkanalyse* (Video). YouTube, Website: <https://www.youtube.com/watch?v=WYe2Sae3M7w>, 2020
- Mische, A. (2011): Relational sociology, culture, and agency. In: Scott, J. and Carrington, P. (Hrsg.): *Sage Handbook of Social Network Analysis*. London, New York, 80–98
- Mitchell, J. C. (1969): The concept and use of social networks. In: Mitchell, J. C. (Hrsg.): *Social Networks in Urban Situations. Analyses of Personal Relationships in Central African Towns*. Manchester, 1–50
- Murphy, J. T. (2018): The relational turn In economic geography. In: Cook, G., Johns, J., McDonald, F., Beaverstock, J. and Pandit, N. R. (Hrsg.): *The Routledge Companion to the Geography of International Business*. London, 161–175
- Obstfeld, D. (2005): Social networks, the tertius iungens orientation, and involvement in innovation. In: *Administrative Science Quarterly* 50, 100–130
- Ouma, S. (2010): Global standards, local realities: Private agrifood governance and the restructuring of the Kenyan horticulture industry. In: *Economic Geography* 86, 197–222
- Owen-Smith, J./Powell, W. W. (2004): Knowledge networks as channels and conduits: The effects of spillovers in the Boston biotechnology community. In: *Organization Science* 15, 5–21
- Pachucki, M. A./Breiger, R. L. (2010): Cultural holes: Beyond relationality in social networks and culture. In: *Annual Review of Sociology* 36, 205–224
- Panitz, R./Glückler, J. (2017): Rewiring global networks in local events: Congresses in the stock photo trade. In: *Global Networks* 17, 147–168
- Ponte, S./Ewert, J. (2009): Which way is “up” in upgrading? Trajectories of change in the value chain for South African wine. In: *World Development* 37, 1637–1650
- Powell, C./Dépelteau, F. (Hrsg.). (2013): *Relational Sociology: Ontological and Theoretical Issues*. New York, NY.
- Rowley, T./Behrens, D./Krackhardt, D. (2000): Redundant governance structures: An analysis of relational and structural embeddedness in the steel and semiconductor industries. In: *Strategic Management Journal* 21, 369–386
- Scott, J./Carrington, P. (Hrsg.). (2011): *Sage Handbook of Social Network Analysis*. London, New York.
- Scott, M. (2015): Re-theorizing social network analysis and environmental governance: Insights from human geography. In: *Progress in Human Geography* 39, 449–463
- Small, S. A. (1995): Action-oriented research: models and methods. In: *Journal of Marriage and Family* 57, 941–955
- Smith, R. G. (2014): Beyond the global city concept and the myth of ‘command and control’. In: *International Journal of Urban and Regional Research* 38, 98–115
- Sorenson, O./Stuart, T. E. (2001): Syndication networks and the spatial distribution of venture capital investments. In: *American Journal of Sociology* 106, 1546–88
- Suddaby, R. (2006): What grounded theory is not. In: *Academy of Management Journal* 49, 633–642
- Susman, G. I./Evered, R. D. (1978): An assessment of the scientific merits of action research. In: *Administrative Science Quarterly* 23, 582–603
- Ter Wal, A. L. J./Boschma, R. A. (2009): Applying social network analysis in economic geography: framing some key analytic issues. In: *The Annals of Regional Science* 43, 739–56
- Tokatli, N. (2013): Toward a better understanding of the apparel industry: a critique of the upgrading literature. In: *Journal of Economic Geography* 13, 993–1011
- Tokatli, N. (2015): Single-firm case studies in economic geography: some methodological reflections on the case of Zara. In: *Journal of Economic Geography* 15, 631–647.

- Tubaro, P. (2019): Whose results are these anyway? Reciprocity and the ethics of “giving back” after social network research. In: *Social Networks*, doi: 10.1016/j.socnet.2019.10.003
- Turkina, E./Assche, A. v./Kali, R. (2016): Structure and evolution of global cluster networks: Evidence from the aerospace industry. In: *Journal of Economic Geography* 16, 1211–1234.
- Uzzi, B. (1997): Social structure and competition in interfirm networks: The paradox of embeddedness. In: *Administrative Science Quarterly* 42, 35–67
- Vorley, T./Mould, O./Courtney, R. (2012): My networking is not working! Conceptualizing the latent and dysfunctional dimensions of the network paradigm. In: *Economic Geography* 88, 77–96
- Wasserman, S./Faust, K. (1994): *Social Network Analysis. Methods and Applications*. Cambridge.
- Williams, T. A./Shepherd, D. A. (2017): Mixed method social network analysis: combining inductive concept development, content analysis, and secondary data for quantitative analysis. In: *Organizational Research Methods* 20, 268–298
- Yeung, H. W.-c. (2005): Rethinking relational economic geography. In: *Transactions of the Institute of British Geographers* 30, 37–51