

Trading routes, bypasses, and risky intersections: Mapping the travels of 'networks' between economic sociology and economic geography

November 2005



Center on Organizational Innovation

Gernot Grabher

Socio-Economics of Space
University of Bonn
Germany
grabher@giub.uni-bonn.de

Center on Organizational Innovation
Columbia University in the City of
New York
803 International Affairs, MC 3355
420 West 118th Street
New York, NY 10027
<http://www.coi.columbia.edu>

This online paper may be quoted under fair use and academic conventions. This paper may not be published elsewhere in any form (including e-mail lists and electronic bulleting boards) without the author's express permission.

The preferred citation for this paper is: Gernot Grabher. Forthcoming in Progress in Human Geography 2006, 30(1). "Trading routes, bypasses, and risky intersections: Mapping the travels of 'networks' between economic sociology and economic geography," Working Papers Series, Center on Organizational Innovation, Columbia University. Available online at http://www.coi.columbia.edu/pdf/grabher_trbri.pdf.

**Trading routes, bypasses, and risky intersections:
Mapping the travels of 'networks' between
economic sociology and economic geography**

Gernot Grabher

Socio-Economics of Space
University of Bonn
Meckenheimer Allee 166
53115 Bonn, Germany
grabher@giub.uni-bonn.de
Fax: +49 228 739731

Forthcoming in *Progress in Human Geography* 2006, 30(1).

Acknowledgements

This paper has been revised and enriched during my stay at the Center on Organizational Innovation (COI) at Columbia University in Spring 2005. I would like to thank David Stark and Monique Girard, the directors of COI, and their colleagues for their hospitality and the opportunity to discuss an earlier version in the CODES seminar series. I am grateful to Michel Callon, Nancy Ettliger, Anna Grandori, Wolf Heydebrand, Roger Lee, Jamie Peck, Jörg Sydow, Duncan Watts, Harrison White, Arnold Windeler, the participants in the CODES seminar and two anonymous referees for insightful comments and constructive scepticism. Special thanks are due to Julia Maintz for helping me to navigate through ANT territory.

**Trading routes, bypasses, and risky intersections:
Mapping the travels of ‘networks’ between
economic sociology and economic geography**

Gernot Grabher

Abstract: In economic geography the notion of the network has come to play a critical role in a range of debates. Yet, networks hardly are construed in an explicit fashion but rather are assumed as some sort of more enduring social relations. This paper seeks to foreground these implicit assumptions – and their limitations – by tracing the selective engagement of economic geography with network approaches in economic sociology. The perception of networks in economic geography is mainly informed by the network governance approach that is founded on Mark Granovetter’s notion of embeddedness. By embracing the network governance approach, economic geography passed by the in fact older tradition of the social network approach. Economic geography thus discarded not only the concerns for network position and structure but also more calculative and strategic perceptions of networks prevailing in Ron Burt’s work. Beyond these two dominant traditions economic geography, more recently, has started to tinker with the post-structuralist metaphor of the rhizome of actor-network theory while it took no notice of Harrison White’s notions of the publics and polymorphous network domains.

Key words: networks, network governance approach, social network analysis, rhizome, publics, inter-disciplinarity

I am part of the networks and the networks are part of me.
 I show up in the directories. I am visible in Google.
 I link, therefore I am.

William J. Mitchell, Me++

I Introduction

1 The big N-thing

The more recent career of networks has been impressive, to say the least. During the early 1980s networks at best have rather grudgingly been taken note of as mongrel hybrids, located somewhere in the obscure zone between the alleged ideal types of markets and hierarchies. From the early 1990s onwards, however, a variety of network forms increasingly expanded the ‘swollen middle’ of the governance spectrum (Hennart 1993). Networks, in fact, turned from the rare exception to literal omnipresence – quite remarkable for a concept that already has been around since Georg Simmel.

The roots of the network concept indeed refer back to Simmel’s (1890) fundamental distinction between ‘groups’ (defined by some membership criterion) and ‘webs of affiliation’ (linked through specific types of connections). By alerting to the critical role of the position of actors in ‘webs of affiliation’ he had laid the foundations for social network analysis. The principal perspective of social network analysis is informed by the ‘anticategorical imperative’ (Emirbayer and Goodwin 1994: 1414) which rejects explanations of “social behavior as the result of individuals’ common possession of attributes and norms rather than as the result of their involvement in structural social relations” (Wellmann 1983: 165; see also see also Wasserman and Faust 1994; Scott 2000). Behavior and processes, in this perspective, are interpreted by reference to the particular structure and configuration of networks which have important behavioral, perceptual and attitudinal consequences for individual actors. Social network analysis, Burt (1986: 106) proclaims programmatically, “captures causal factors in the social structural bedrock of society, bypassing the spuriously significant attributes of people temporarily occupying particular positions in social structure”.

In sociology, anthropology and psychology, the social network approach was employed in a broad range of empirical contexts ranging from explorations of reference groups and role sets through the analysis of social support to studies of the diffusion of information (Smith-Doerr and Powell 2003). One empirical context most notably, though, remained somewhat out of focus: Although industrial sociologists (Roy 1954; Dalton 1959) had long demonstrated the hidden powers of informal networks within formal organizational practices and structures, the social network approach hardly paid sustained attention to economic activity.

The enormous upsurge of theoretical interest in networks in the economy during the last two decades was mainly catalyzed by Mark Granovetter’s (1985) notion of embeddedness. By stressing “the role of concrete personal relations and structures (or ‘networks’) of such relations in generating trust and malfeasance”, Granovetter (1985: 490) shifted the analytical perspective on networks in two respects. The notion of embeddedness provided a robust framework to study the institutional

mechanisms by which networks are initiated, coordinated, monitored, recombined and terminated. This view on network governance thus shifted the focus from examinations of network structure and position to concerns with particular institutional contexts in which actors are embedded. Concurrently, this reorientation from the structure of networks to their specific contents implied a move from the austere quantitative methodology of sociometrics towards qualitative explorations of case-study research.

From the early 1990s on, economic geography keenly embraced the network governance approach that evolved around Granovetter's embeddedness notion (see Dicken and Thrift 1992; Grabher 1993a). The Granovetterian reading of embeddedness in fact not only turned into *the* master-paradigm of the new economic sociology but also epitomized a highly versatile key concept in the economic geography of the so-called 'cultural turn' (see Peck 2005). Boosted by the excessively celebrated 'resurgence of regional economies' (Piore and Sabel 1984), the network governance approach afforded a multipurpose conceptual template on which the piles of Marshallian accounts on the allegedly re-emerging regional economies could be built. Regardless of how much the various variants of territorial innovation models (Lagendijk 2001) differed conceptually or semantically, they all seemed to be tight together by networks, at least in the rather generic sense of more or less durable ties (see also Dicken et al. 2001: 10-11). The conceptual elasticity of the notion of networks appeared not only as a precondition for the proliferation of networks throughout economic geography (critically, see Markusen 1999; see also Grabher and Hassink 2003). Moreover, it also afforded a major platform for cross-disciplinary exchange between economic geography and economic sociology more generally.

2 The structure of the paper: mapping cross-disciplinary trade

In this paper I wish to assess this selective engagement of economic geography with network approaches in economic sociology. This evaluation, on the one hand, attempts to draw a balance of the productivity of the network governance approach in stimulating research in economic geography and in galvanizing cross-disciplinary exchange. On the other hand, however, the paper also attempts to foreground the (presumably unintended) consequences of the exchange that did *not* occur: By privileging the network construal of the governance approach economic geography unavoidably opted against competing conceptions of the older social network tradition. This evaluation is not motivated by the scholastic ambition to bring charges of biased awareness against economic geography. By turning the view also beyond the two dominant network traditions, the paper rather seeks to identify promising cross-disciplinary debates that might extend, challenge or reaffirm our prevailing, quite often implicit assumptions on networks. At the very least this assessment will disclose those areas of cross-disciplinary exchange that we might decide not to explore further – on the basis of a clearer perception of what we opt against, though. The evaluation is framed as a mapping exercise in which the actual routes and the potential pathways of the travels of the notion of networks between economic sociology and economic geography are sketched.

The paper sets off by depicting the main trading route of the network governance approach (Section II) that was firmly founded on Granovetter's relational conception of embeddedness. This route branched off into the partially overlapping areas of project, strategic, informal, and regional networks to which economic geography contributed in varying degrees. Invariably, though, economic geography stuck with the 'strong tie'-end of Granovetter's paradigmatic dichotomy and turned networks into a shorthand for enduring, trust-based ties. Presumably reflecting the intention

to dissociate the discipline unmistakably from economics as the ‘science of suspicion’ (Charles Sabel), economic geography until more recently seemed to confine its interest in networks to their benevolent attributes. In general a “... spirit of optimism has been linked to discussions of economic networks. They have been viewed as innovative, adaptive, resilient, open, and regenerative economic forms and [...] often seem to be connected with a sense of fairness or economic democracy” (Leitner, Pavlik and Sheppard 2002: 278-9). Apart from the occasional gesture towards some ostensibly ‘dark sides’ of networks, economic geography dispensed with the less munificent variants of networks that are forged to contravene hierarchical rules, mobilize conspiracy or organize crime. Instead, economic geography focused on the indeed very human side of family, friendship and kin in economic relations.

The paper subsequently ventures into the largely uncharted terrain of the social network approach that the main trading route between economic geography and economic sociology was passing by (Section III). Economic geography, in other words, hardly took a systematic interest in the behavioral consequences of network configuration. Notions like the ‘teritus gaudens’ (the third who benefits) and ‘structural equivalence’ (Burt 1987) exemplify the critical role of network position and structure and fundamentally depart from the cohesion-fixated ideas of networks that traveled along the main trading route. By shifting the focus to non-redundant ties and ‘structural holes’, in particular Ron Burt’s (1992, 2000) social network analysis invites an understanding of arbitrage and innovation that sharply contrasts with the ‘strong-tie’ view of trust-based relations prevailing in economic geography. More recently, research on ‘small worlds’ (Watts 1999a, 2003; Watts and Strogatz 1998) has underlined the often surprisingly strong connectivity of networks and elucidated the vulnerability of networks around key hubs (Albert, Jeong and Barabási 2000), another issue that economic geography has hardly been concerned with.

By moving way beyond the two dominant network traditions the paper finally approaches two risky intersections (cautiously, of course) at which the familiar tie-and-node imagery of networks are stretched, crumpled up and blurred (Section IV). The first alternative trope to this network depiction is the ‘rhizome’, a metaphor for a multiplex, heterogeneous and robust web of relations (Deleuze and Guattari 1988) that influenced in particular the (later) actor-network theory (Callon 1986; 1998; Latour 1988). Although the rhizome metaphor has not even come close to the status of an alternative to the network conception prevailing in economic geography, it provides a conceptual pivot to shift beyond the established dualisms of structure/agency, subject/object, human/non-human and to move further towards topological understandings of space and networks. Utterly unexplored by economic geography so far remained Harrison White’s (1992a,b) route to dissolve crisp tie-and-node cartographies into more polymorphous and overlapping network domains. Between the more fluid and incoherent relational ties, ‘publics’ afford the social spaces in which the identity of actors only temporarily crystallizes at the intersection between different domains (Mische and White 1998).

After this excursion into the wide and ramified conceptual terrain, the paper does not pretend to offer a comprehensive synthesis that, somewhat naïvely, seeks to redraft the map of the cross-disciplinary exchange (and mutual ignorance) into a more coherent and presumably more pleasing picture. The paper does *not* claim to provide the definitive guide for cross-disciplinary hitchhiking through network territory. Nevertheless, however, the paper concludes by suggesting some directions for further excursions, alerting to their risks and pointing to some vantage points. Ready?

II The trading site: the network governance approach

1 The New Institutional Economics-vs.-New Economic Sociology antagonism

Cross-disciplinary trade in networks, without doubt, primarily evolved on the extended terrain of the governance approach. Above all, the governance approach focuses on the institutional mechanisms by which networks are initiated, coordinated, monitored, recombined, and terminated (Oliver and Ebers 1998). In contrast to the social network tradition with its formalistic exploration of network structure and position, the governance approach concentrates on the particular institutional and social contexts in which actors are embedded. From concerns with the formal structure of networks the governance approach marks a shift to an engagement with the specific contents of networks (see also Smith-Doerr and Powell 2003).

A major path leading to this trading zone was marked by the stylized and dramatized antagonism between Ronald Coase and Oliver Williamson on the one side, Karl Polanyi and Mark Granovetter on the other. The acts in the confrontation of these two titanic pairs are rather well-known and have become, at least in their abridged version, an integral element in the eclectic ensemble of theoretical building blocks that make up ‘economic geographic theory’. The stage was set by Coase (1937) who asked the simple, yet compelling question of why so much activity takes place inside formal organizations if markets are allegedly optimal mechanism for resource allocation. Coase answered this question by attending to the costs of exchange: when the transaction costs of market exchange are high, it may be less costly to coordinate transactions through a formal organization.

This seminal piece indeed lay fallow, so to speak, for almost four decades until it was picked up by Williamson (1975, 1985, 1991) and proponents of transaction cost economics in the 1970s. By theorizing both governance structures and organizational forms, the economics of organization subsequently moved much closer to the fields of law, economic sociology, organization theory, business studies. From the early 1990s onwards, this corpus of research was also increasingly taken up in economic geographic reasoning (see, for example, Camagni 1991; Grabher 1993a; Yeung 1994; Amin and Hausner 1997; Oinas 1997). The ‘in-a-nutshell’-variant of Williamson’s transaction-cost framework was the vehicle for this move closer to the social sciences and became the emblematic representation of the New Institutional Economics (NIE). Not surprisingly, of course, this vehicle was not unambiguously enthusiastically welcomed in all branches of the social sciences.

The most forceful and authoritative challenge was launched when Granovetter addressed the ‘*Problem of Embeddedness*’ (1985) which emerged as *the* master paradigm of the New Economic Sociology (NES) (Swedberg 1997). In the transaction-cost approach, so the fundamental critique, under- and oversocialized concepts of economic action complement one another. Not far from Hobbes’ ‘state of nature’ or Rawls’ ‘original position’, the undersocialized perception of the market invokes an idealized state of affairs in which behavior is unaffected by social structure and relations. Interactions among actors are confined to discrete exchanges between independent actors: “Sharp in by clear agreement; sharp out by clear performance” (Macneil 1974: 378). As in Hobbes’ *Leviathan*, the problem of disorder is ‘solved’ with an oversocialized concept of hierarchical power within the firm, which deflects opportunism by making potentially divisive decisions by ‘fiat’.

In a rather unambiguous move, economic geography took to the NES-side of the antagonism, endorsing a particular Granovetterian conception of embeddedness. While Polanyi primarily used the notion as a kind of shorthand for his *method* studying institutions as concrete, multiply-determined objects that could follow different social logics simultaneously (Krippner 2001: 777), Granovetter (1985: 490) ‘scaled down’ the concept to the analytical level of concrete personal relations and networks. Ironically, economic geographic approaches in general seem to have a stronger affinity to Polanyi’s (1973: xlvii) original understanding of embeddedness as an analytical strategy to “grasp [institutions] in their concrete aspect” as a complex mix of social logics. Nevertheless the discipline embarked on Granovetter’s relational interpretation of embeddedness that seemed to provide a highly versatile conceptual template around which the empirics of the re-emerging regional economies could be build.

The second major line of critique on Coase and Williamson focused on the dichotomous view of markets and hierarchies. Richardson (1972: 883) fairly early on drew attention to the increasing involvement of firms in non-market arrangements that refute the all too clear cut dichotomy of firms as “islands of planned coordination in a sea of market relations”. In practice, Richardson (1972) insisted, firms build substantial barriers between themselves and such tempestuous seas by entering into all kinds of intermediate arrangements between market exchanges and hierarchies, ranging from subcontracting relations and strategic alliances to franchising and decentralized profit centers. Although this continuum view with two ideal types at each pole served as a useful analytical entry, it also imposed serious limitations (Bradach and Eccles 1989: 116). By conceiving of markets and hierarchies as the ‘pure’ forms, intermediate organizational designs were reduced to ‘mongrel hybrids’ instead of a distinctive mode of governance (Powell 1990). More and more, though, networks have come to be seen as a specific mode of governance in the ever extending range between the alleged ‘ideal types’. Most critically, this view also opened up a niche in the broad spectrum of network forms that appeared to be cut out for economic geography.

2 Network forms: placing economic geography in network studies

By unscrupulously cutting through the cornucopia of network forms and organizational variants that the elasticity of the notion has engendered, networks can be systematized along two dimension, that is their duration and governance (Sydow 2003). Different temporal dimensions have important consequences for the types of regulation of network relations. Long-term networks, for example, are shaped by reciprocal ties of experience and expectations emerging from the ‘shadow of the future’ (Axelrod 1984) alike. The governance of networks spans a broad spectrum from authoritative to distributed or, phrased differently, from more hierarchical to more heterarchical (Sydow 2001). In hierarchical networks, control is exerted by a more or less clearly identifiable center or coordinator who regulates network practices and rules, such as the selection of network members, the allocation of resources, the evaluation of network practices, and the maintenance of network boundaries. In heterarchical networks, in contrast, the regulation of interaction and relations is distributed and associative (Hedlund 1986; 1993). Moreover, heterarchical networks exhibit patterns of emergent self-organization, strong lateral ties, and a diverse distribution of authority (Stark 2001).

The two dimensions of stability and forms of governance open up a rather simple typology of informal networks, project networks, strategic networks and, the prime focus of economic

geographic research in this context, regional networks. These forms, of course, do not represent distinct or essentialist categories, but rather overlap and interpenetrate each other to varying degrees. The particular network forms indeed evolve as complex combinations of overlapping, juxtaposed, and nested government mechanisms (Powell 1990: 323). This simple typology (an earlier version of which has been laid out in Grabher and Powell 2004: xvii-xxii), nevertheless, is employed to locate main routes of the inter-disciplinary exchange between economic sociology and economic geography in the governance tradition of network analysis.

3 Project networks: the discovery of the spatial context

The task-specific assembly of participants in project networks typically displays a considerably higher level of hierarchical coordination than informal and regional networks. While informal networks are based on *interpersonal* ties and strategic networks are configured as *interorganizational* alliances, project networks interweave inter-organization and inter-personal relationships (Boltanski and Chiapello 1999). In contrast to other network forms that vary with regard to duration, projects are temporally limited by definition: Deadlines are the emblematic feature of these ‘temporary systems’ with institutionalized termination (Goodman and Goodman 1976; Lundin and Söderholm 1995; DeFillippi and Arthur 1998).

The temporal limitation and radical task orientation of project networks hold the promise of efficiency gains that, in turn, have propelled the diffusion of this organizational form throughout the economy. The transience of projects, however, also poses formidable challenges with regard to their coordination and control (Ekstedt et al. 1999). Projects often entail high-risk outcomes, however, they lack normative safeguards that minimize the likelihood of failure. Moreover, there is rarely sufficient time to develop personal confidence that could compensate for the absence of shared experience, familiarity or social coherence. Project networks presuppose trust, yet their temporal limitation seems to hinder its development (Meyerson, Kramer and Weick 1996).

This fundamental paradox of project organization has increasingly shifted the attention from a functionalist understanding of the singular venture and concerns with its ‘optimal’ organizational design to a problematization of the institutional context in which projects are embedded (see, for example, DeFillippi et al. 2004; Söderlund 2004). This contextual view rejects the conventional perception of the project as a phenomenon isolated from its history, stripped of the contemporary social and spatial context and independent of the future (Engwall 2003). Projects in this perspective rather are seen as inextricably interwoven with an organizational and social context which affords key resources of expertise, reputation and legitimization (Blomquist and Packendorff 1998; Ekstedt et al. 1999; Gann and Salter 2000; Sydow and Staber 2002; Grabher 2002a; Davies and Hobday 2005).

The shift from managerial considerations of the optimal design and implementation of the single project to the institutional complexities of the project context has brought the regional level into the focus of project research in economic sociology and thus triggered some interest in economic geographic perspectives on temporary organizations. Beyond the obvious Marshallian dynamics of localized pools of specialists, the more recent concerns with regions as ‘repositories of knowledge’ (DeFillippi et al. 2004) has drawn economic sociological attention to geographical notions of localized learning processes. More generally, the increasing sensitivity towards space in the social sciences (see, for example, the debate in Grabher and Hassink 2004) seems also to have engendered

the interest in the geography of projects with their multiple intertwined layers of highly localized and trans-local networks (see, for example, Sydow and Staber 2002). This cross-disciplinary exchange has yielded, amongst others, the notion of the ‘temporary cluster’ (Aldermann 2002), the ‘project cluster’ (Reinmoeller 2003) or the ‘project ecology’ (Grabher 2002b; 2004) to capture the spatial and social logics of temporary organizational arrangements.

4 Strategic networks: the realm of corporate ties, the realm of economics?

Formal interorganizational relations are, by their very nature, more strategic and tightly orchestrated than either informal or regional networks. While less tightly controlled than the chain of command in large hierarchical firms, strategic networks are much more centrally organized than informal or regional networks in terms of the selection of network members, the allocation of resources and distribution of revenues, and definition of network boundaries (Jarillo 1988; Lorenzoni and Baden-Fuller 1995; Sydow 2003). In general, communication channels and information flows are also less open and permeable than in regional and informal networks. Ties in business networks are forged, in a much more distinct and manifest fashion than in other forms, by power (Håkansson and Johanson 1988).

The hierarchical relations and attendant asymmetries of power are the emblematic governance mechanisms within the large corporation. The efficacy of ‘fiat’, however, is particularly limited in multinational and global corporations because subsidiaries often control strategic resources and key competences, as well as critical linkages with key actors in their local environments (Ghoshal and Bartlett 1990). Typically, in such large, dispersed, and interdependent organizations, hierarchical authority coexists with significant levels of local autonomy (Hedlund 1993; Sölvell and Zander 1995). Intra-organizational ties and external network relations with customers, distributors, and suppliers thus interpenetrate one another (Johanson and Mattson 1987; Cantwell and Santangelo 1999).

While importing *en gros* from the sociological (and, of course, business management) literatures on the internal organization of large corporations, economic geography exported *en detail* vivid narratives and, in a few rare case, conceptual guidelines to construe the interdependencies between internal and external ties of multinational corporations and their host economies. Above all, Peter Dicken’s inventive matrices of local and non-local linkages elaborated in *Global Shift* (2003) traveled beyond the confines of the respective economic geographic debate. While earlier work in this field seemed primarily concerned with issues of ‘external control’ of regions through large corporations, economic geography more recently seems to have adopted a less politicized perspective that circles around the question if and how large corporations function as ‘pipelines’ through which regions get access to global knowledge (see, for example, the debate on innovative milieus or, more recently, Bathelt et al. 2004). The critical concerns with the cathedrals-in-the-desert syndrome and asymmetrical power relations (so powerfully conceptualized in Doreen Massey’s (1979) framing of ‘the regional problem’) thus apparently were superimposed by the fascination with interactive learning processes (for a critical view, see Hudson 1999).

Particularly the more recent managerial imperatives to concentrate on the so-called core competencies and to externalize non-core activities have extended the interest in strategic networks from the large corporation to supplier networks. The universally prescribed slimming down into ‘lean’ organizations has forked into a variety of paths, ranging from market-driven adversarial

transactions to cooperative ties of mutual learning and interactive innovation processes (Helper 1993). Cross-country comparisons, in fact, have revealed that opportunism and trust are highly variable and dependent on specific national and regional institutional settings (Asunama 1985; Lane and Bachmann 1997; Sako and Helper 1998; MacDuffie et al. 1999).

Within economic geography, the issue of the vertical disintegration figured large in earlier transaction-cost inspired attempts to come to grips with agglomeration economies in the early California School of Allen Scott and Michael Storper (1986; 1988). Vertical disintegration and supplier relations indeed took center stage with the discovery of the Italian industrial districts. Particularly the canonical studies of Modena and Prato portrayed these textile districts as modernized versions of the putting-out system that offered an effective alternative governance to the “false promises of vertical integration” (Lazerson 1993: 203). The increasingly formulaic reference to the notion of embeddedness had alerted economic geographic inquiry to the entanglement of multiple social logics within supplier networks, yet the core thrust of this concept has also been flattened out in the course of the diffusion of the idea: emptied out from the essentially social gist, embeddedness of supplier relations has been occasionally trivialized to dense local forward and backward linkages.

Similarly, economic geography somehow subsumed the realm of the horizontal ties of strategic alliances in the diffuse outer zone of the ‘global’ operating beyond the familiar regional worlds. Perhaps economic geography took no significant interest in these horizontal ties (with notable exceptions, though, see Dicken et al. 2001; Coe et al. 2004) since they are, as the adjective ‘strategic’ suggests, less firmly embedded in social webs of regional and informal networks (Gerlach 1990; Gomes-Casseres 1996). The attribute ‘strategic’ presumably was read as a warning to stand clear from what obviously belonged to the realm of economic inquiry properly. Moreover, with the more recent shift from enduring joint ventures to short-term non-equity partnerships, such as R&D pacts and joint development agreements (Hagedoorn 2002) strategic alliances have turned into much more ephemeral phenomena that, by their very nature, elude a quintessential geographical exercise, that is pinning down spatially ‘crystallized’ social phenomena onto a map.

5 Informal networks: from import to selective exchange?

Membership in an informal network is typically based on shared experience, pre-existing social ties or the thick bonds of kinship and ethnicity that draws participants together. Given that such relationships emerge out of repeated exchanges, informal networks symptomatically involve comparatively long-time horizons. Research on informal networks has portrayed this type of network governance rather ambivalently. Whereas one strand of research pays tribute to the essential compensatory role and ‘lubricating’ effects of informal ties in mitigating structural shortcomings of markets and hierarchies, a somewhat less prominent line of inquiry is primarily immersed in exposing the potentials of informal networks to disrupt markets and obstruct hierarchies.

The compensatory role of informal networks in market settings has been evinced, for example, in Geertz’s (1978) classic account of the Moroccan bazaar that, at first glance, appears to approximate neoclassical price-driven markets. Yet, in order to improve the richness and reliability of information, buyers and sellers establish continuing relationships based on reciprocity. Using

informal relational contracts to cope with volatility is not confined to ostensibly ‘pre-modern’ contexts. Similar to the traders in the noisy informational environments of a bazaar, traders on the financial markets of the Wall Street or the City of London instrumentalize ties with other market participants to evaluate and triangulate information, rumors and gossip (Baker 1984; Abolafia 1997), a line of reasoning to which economic geography has contributed significantly (Amin and Thrift 1992; Leyshon and Thrift 1997; McDowell 1997).

Presumably the most vivid contrast to the sterile image of spot-contracting between atomized actors has been revealed in research on ethnic networks that afford the relational architecture of enclaves and ethnic economies (Light 1972; Waldinger 1996a). Ethnic ties “suffuse an otherwise ‘bare’ relationship with a sense of collective purpose” (Portes and Bach 1985: 345) by providing ‘bounded solidarity’ and ‘enforceable trust’. The amalgamation of these collective assets in the notion of the ‘social capital’ (in the spirit of Coleman 1988) subsequently tended to privilege the enabling attributes of informal networks (Putnam 1993). This focus on the short-term benefits of social capital glanced over earlier accounts that illuminated how informal networks might turn into mobility traps over time (Granovetter 1973; Sanders and Nee 1996).

Despite the imminent spatiality of ethnic networks and enclaves the geographical community initially has been less involved in the relevant conceptual debates (Kaplan 1998: 487). In fact, it was up to the sociologists Waldinger (1996b) and Light (1998) to make the case for geographical perspectives and scholarship in advancing theories on migration and ethnic economies. The more lively cross-disciplinary trade in more recent times noticeably has moved beyond the emblematic genres of geography such as the idiosyncratic portrayals of the place-based nature of local enclaves and ethnic economies to explore the transnational character of migration and ‘transmigrants’ (Zhou and Tseng 2001; Smith and Bailey 2004), ethnic networks (Castells 1996; Crang et al. 2003) or global elite networks (Sassen 2002; Beaverstock 2005).

Informal networks are not only established to interpret information and to mobilize collective sources of reciprocity in turbulent market settings. Due to their informality, these networks are also particularly well suited to collectively distort, suppress or manipulate market information. Consequently, informal networks can provide a context for practices ranging from corruption and conspiracy (Baker and Faulkner 1993) to organized crime in violent Mafia-type networks (Gambetta 1988; Della Porta and Vanucci 1999; Friman 2004) or terrorist networks (Dillon 2002; Raab and Milward 2003). In fact, the risks associated with crime make trust “far more necessary among criminals than among businessmen” (Arlachi 1986). Significantly, economic geography has remained largely absent from this strand of research. Economic geography’s interest in Italian informal networks, for example, focused rather on the ‘impanatore’ than on the ‘godfather’, was more concerned with the societal benefits of trust and social capital than with the power of honor and shame. More recently, though, the destructive potential of informal networks has been taken up in contributions on terrorist networks (see, for example Ettliger and Bosco 2004; Thrift 2004).

Informal networks also evolve in organizational contexts that are governed by formal, hierarchical control. And like in market environments, informal ties in hierarchical organizations fulfill multiple roles. They can compensate for the structural weaknesses of hierarchies when they, for example, constitute ‘communities of practice’ (Brown and Duguid 1991; Wenger 1998). Such lateral, self-organized networks, “informally bound together by shared expertise and passion for a joint enterprise” (Wenger and Snyder 2000: 139), provide decentralized means of learning and usually

not in conflict with organizational goals. The notion of communities of practice has rather rapidly migrated into a broad range of (sub-)disciplinary contexts and has in the wake of the intertwined debates on the knowledge-economy and learning increasingly been employed in economic geography (see, for example, Gertler 2003; Coe and Bunnell 2003; Amin and Cohendet 2004).

While economic sociology seems to embrace the janus-faced character of informal relationships in hierarchical contexts, economic geography once more narrowed the focus to the more benevolent and functional dimensions of informality. The absence from this strand of research appears all the more remarkable since the success of informal coalitions in evading organizational rules and contradictions, as Dalton (1959: 49) asserted in his classic study of *Men Who Manage*, involved joined action “of a kind rarely, if ever, shown in carrying on official activities.”

6 Regional networks: the ambivalence of an export ‘success’

Presumably the busiest cross-disciplinary trade unfolded, not surprisingly though, in the realm of regional networks, the natural domain of economic geography so to speak. The early accounts on the imbrication of family, community, polity and business within tightly knit localities in the Third Italy (Becattini 1978; Brusco 1982; Piore and Sabel 1984; Pyke, Becattini, and Sengenberger 1990), Baden-Württemberg (Herrigel 1993, 1996) and Silicon Valley (Saxenian 1994; Kenney 2000) provided most vivid embodiments of the notion of embeddedness. Although networks were rarely theorized in an explicit fashion they denoted an integral ingredient in these Marshallian accounts that envisioned networks mainly in a rather generic sense as a shorthand for all sorts of ties that did not adhere to a straightforward market logic.

Presumably overwhelmed by regional worlds that radiated such a strong sense of (old European) cultivation vis-à-vis the brute force of uncivilized (US-style) big corporate capitalism, economic geography raved about regional networks. These small firm networks obviously held the promise to combine economic imperatives of efficiency, innovativeness and resilience with a sense of economic democracy and social fairness (critically, see Leitner, Pavlik and Sheppard 2002: 278-9). More cautionary interventions that pointed to the ambivalence of dense network ties and their inherent tendency to turn from ties that bind into ties that blind initially were rather rare (see, for example, Grabher 1993; Scott 1998).

The euphoria of the new regionalism and the rediscovered region, indeed, also co-produced ‘overterritorialized views on embeddedness’ (Hess 2004: 174-5) culminating in ‘local fetishism’. Initially productive conceptions of territorial innovation models (Legendijk 2001) like innovative milieus, regional innovation systems and, above all the cluster notion that had branched out from the district debate more and more seemed to constrict the view on regions to isolated ‘islands of innovation’ (Amin and Cohendet 2004: 87). Despite convincing attempts to break out of what increasingly appeared as the straight-jacket imposed by Marshallian analysis (Amin and Thrift 1992; see also Gordon 1991; Camagni 1991; Gertler 1995), the dominant insular perception of regions during the 1990s in fact even seems to have been stabilized through cross-disciplinary trade. The biggest export successes of economic geography thus reproduced a local fetishism that within economic geography had come under increasingly fierce and substantial attack (see, for example, Bunnell and Coe 2001; Coe and Bunnell 2003; Oinas 2000; Bresnahan et al. 2001). As apparently symptomatic for cross-disciplinary trade, concepts seem to travel farther when ‘frozen’ in their infant rough-and-ready state.

Lately, however, imports from economic sociology in fact have also turned into authoritative conceptual pivots to brake away from the obdurate deadlock of the local fetishism. One of these instances relates to Powell's studies of biotechnology networks and his instructive distinction between 'local broadcasting' and 'global pipelines' (Owen-Smith and Powell 2004) that traveled across the disciplinary boundary into economic geography (see, for example, Bathelt et al. 2004). This conceptual step from the local into the non-local appears long overdue, yet it still seems rather distant from a topological understanding of spaces (Amin and Cohendet 2004: 154) that allows "an understanding of individual sites as a node of multiple knowledge connections of varying intensity and spatial distance, as a place of trans-scalar and non-linear connections, and as a relay point of circulating knowledges that cannot be territorially attributed with any measure of certainty or fixity" (see also Allen 2000: 28; Amin 2002).

How far such more demanding notions of proximity will travel back into economic sociology remains an open question, to say the least. Up until now, the interest of economic sociology (and other disciplines that economic geography rather self-confidentially conceives as 'neighbors') was primarily confined to narratives about *physical* proximity which, after all, appeared as the core field of expertise of (economic) geography. Economic geography, to be sure, for rather long had cultivated this self-conception of the science of the meso-scale, holding the privileged expertise for the analytical level located somewhere between the macro/structural and the micro/idiosyncratic.

Some of the structural limitations of the regional network debate, above all its fixation with the blessings of embeddedness and the benevolence of trust-based ties reflect the willing engagement of economic geography with the governance approach. Economic geographic imaginations of networks, phrased differently, hardly appreciated the second, in fact older tradition of social network analysis in a more systematic fashion. Presumably economic geography was deterred from venturing deeper into this terrain by the austere and formalistic style of the social network approach that appeared to clash harshly with the predilection for qualitative approaches of the 'cultural turn'.

III Bypasses and uncharted terrain: social network analysis

1 From network contents to network structure?

Social network analysis starts from the assumption that social behavior cannot simply be explicated by the individual attributes of actors. Explanations stem from analyses of patterns of relations. The hallmark of social network analysis, in Laumann's (1979: 349) words, is to account for "the behavior of network elements (i.e., the nodes) and of the system as a whole by appeal to specific features of the interconnections among the elements." The austere style of theorizing in social network analysis is deliberate and reflects the chief strategy to avoid the 'traps' of categorical thinking. In this sense, social network theory attempts to institute a relational mode of analysis that breaks away from tired debates about the primacy of structure or agency in determining social action (Krippner 2001: 769).

These debates reflect the efforts to ground social science on the unexamined construct of the person as an *entity* characterized by the "typical laundry list of variables of interest in social science" –

age, race, class, gender, etc. – that are conceived as causal factors. Social network analysis, in contrast, places relations right in the core of social science. The intersection of such relations in concrete persons, social network theory maintains, is coincidental. Advocating methodological relationalism in a most consequent fashion, White (1992: 197) rejects the person as the basic and unquestioned elementary building block, the ‘atom’ as it were of social analysis.

Referring back to Simmel’s (1890, 1923) fundamental distinction between groups and “webs of affiliation”, networks represent sets of actors linked through specific types of connections. An industry, for example, consists of a group of companies who all may be members of a trade association while a web of industry affiliations describes alliances between firms, interlocking directorates, or supply-chain relations among buyers and sellers. As a most basic representation of such affiliations, Moreno (1934) devised the formal language of the nodes and lines of the ‘sociogram’ which became the emblematic conceptual representation of the social network approach. Over the last decades, the rather basic formal language of the sociogram or ‘graph’ has been translated into software-tools (e.g., UCINET, KrackPlot, Inflow, Pajek) to analyze and depict features of relationships parsimoniously (Scott 2000). Although this strand of research has attracted criticism for its structural bent (Mizruchi 1994), it produced a range of potent tools to conceptualize the interdependencies of behavior and processes in the network (Wassermann and Faust 1994; Smith-Doerr and Powell 2003). In economic geography the conceptual toolkit of social network research, particularly the ‘positional analysis’ (Krippner 2001: 792) *à la* Burt, has hardly been employed although it offers, as the next section aims to indicate, some imaginative conceptual devices.

2 Structural equivalence: the logic of ‘keeping up with the Joneses’

Which type of network configuration is favorable to social contagion? By posing this question Burt (1987) addressed the issue of the diffusion of innovations. Although, of course, Burt was interested in the social mechanisms of contagion, this issue rather obviously has an essentially geographical dimension. According to a more familiar line of reasoning, frequent interactions and emphatic communication between network members smoothens adoption. This logic of cohesion, in Burt’s (1982, 1987) analysis is less powerful in driving diffusion than the social pressures created by structural equivalence. Structural equivalence, broadly conceived, occurs when two actors occupy similar positions in a social system by having identical ties with other network members (Lorrain and White 1971; White, Boorman and Breiger 1976).

Generally, structural equivalence predicts that actors identically positioned in the flow of influential communication will use each other as a frame of reference for subjective judgments even if they have *no* direct communication with each other (Burt 1987: 1293). It is, phrased differently, not through intense exchange between network members but rather through the perception of the action proper for an occupant of a specific position in the network that diffusion is primarily driven (see also Galaskiewicz and Burt 1991; Burkhardt 1994). Structural equivalence shifts the perception of the driving forces of innovation. Rather than being smoothly diffused through dense local relationships, innovation in this perspective is primarily stimulated by social pressure of mutual comparison: the merciless mimetic pressures of ‘keeping up with the Joneses’.

This conclusion affords a reorientation of our views on innovation and learning in general and invites a reappraisal of the different variants of territorial innovation models (Legendijk 2001). By

revolving around the crucial importance of a dense web of intra-regional linkages, these models apparently tend to overemphasize the dynamics of cohesion at the expense of structural equivalence. More recently, a critical line of reasoning that resonates with the structural equivalence argument has been voiced pointing to the crucial role of mutual awareness and observation in stimulating regional innovation. Amongst the pioneers that explored this particular path in economic geography, Maskell and Malmberg (2002; 2003) pointed to the relevance of observation, imitation and mimetic processes more generally. This line of reasoning might benefit from drawing more explicitly on economic sociological imaginations, such as Podolny's (2001) instructive differentiation of 'networks as pipes' (through which resources are conveyed) and 'networks as prisms' (through which information about a person is inferred from ties to third parties) (see also the related concept of 'network transitivity' by Uzzi and Gillespie (2002)).

3 Tertius gaudens and structural holes: arbitrage and robust action

A further key principle in social network analysis alerts to the vital importance of network position of individual actors for understanding social behavior. In a triad, as again Simmel (1923) already had elaborated, the *tertius gaudens* (the third who benefits), can leverage off a stable entrepreneurial position by creating competition: "Make simultaneous, contradictory demands explicit to the people posing them, and ask them to resolve their—now explicit—conflict" (Burt 1992: 76; see also Merton 1957: 430). In this way, competition is 'produced' by elevating tensions. As Simmel (1902: 185-186) elucidated under the rubric 'divide and rule' this strategy holds equally well with large groups and networks. Entrepreneurship, generally speaking, in this perspective galvanizes around strategies to divulge and broker contradiction and tension between others.

Burt (1992, 2000) has further built on Simmel's tertius role in his discussion of how actors who connect two others previously unknown to each other bridge a 'structural hole'. These bridges represent unique, non-redundant ties between networks that otherwise would remain separated. Such non-redundant ties derive benefits from informational efficiencies since they provide opportunities for exploration and arbitrage. By bridging a structural hole, an actor overlooks a wider information screen and for that very reason becomes an even more attractive network contact to other actors thus providing new opportunities to expand network contacts according to her particular interests. Moreover, actors close to structural holes "are at higher risk of having good ideas" (Burt 2004: 349) since they enjoy more opportunities to select and synthesize alternative ways of thinking.

The tertius position affords autonomy and maneuverability that can be instrumentalized for a strategic play that Padgett and Ansell (1993) label 'robust action'. At the core of robust action is the fact "that single actions can be interpreted coherently from multiple perspectives simultaneously, the fact that single actions can be moves in many games at once" (Padgett and Ansell 1993: 1263). The outcome is flexible opportunism, that is, maintaining discretionary options across unforeseeable futures in the face of attempts to narrow those options. Crucial for maintaining discretion is not to disclose any specific goals: "For in nasty strategic games ... positional play is the maneuvering of opponents into the forced clarification of their (but not your) tactical lines of action" (Padgett and Ansell 1993: 1265). Victory, hence, means locking in others, but not yourself, to goal-oriented sequences of strategic play that become predictable thereby. As Stark (1996) has demonstrated against the background of the post-socialist transformation, actors that can switch

between various positions they hold simultaneously in various networks, can pursue such strategic games to evade accountability (see also Sedaitis (1997) on ‘shark behaviour’ in emerging markets).

This sort of entrepreneurship and arbitrage that flows from exploiting ambivalence is a far cry from the relentlessly innovative incarnation of the Schumpeterian entrepreneur in current district and cluster debates. And while the networks in economic geographic narratives are portrayed as webs of trustful ties to curb opportunism and to engender cooperation and innovation, networks emerge from Burt’s conception rather as vehicles to pursue opportunistic behavior and to produce competition. The iconographic economic geographic accounts are fixated on ‘sharing’, trust and mutual learning; Burt’s viewpoint focuses on ‘dividing’, arbitrage and strategic games.

4 Strength of ties: on the importance of outsiders and strangers

Although explicitly less technical and algebraic in its approach than White and Burt, Granovetter’s (1973; 1974; 1995) studies on job search offered substantive and analytical continuity with earlier sociometric work (Scott 2000: 34-36). Put briefly, information that was crucial for *Getting a Job* (Granovetter 1974) was provided, rather than by family and friends, by work-related contacts. By drawing on information diffusion models, Granovetter (1973: 1366) elaborated the elegant simplicity of the ‘strength of weak ties’: “whatever is to be diffused can reach a larger number of people, and traverse greater social distance (i.e., path length), when passed through weak ties rather than strong.” Weak ties score rather low with regard to the amount of time, the emotional intensity, the intimacy (mutual confiding) and the reciprocal services which characterize those relationships.

Conversely, the information received in the strong-tie networks is likely to be stale information, already received from the other members of the ‘F-connection’ of families and friends (Ben-Porath 1980): Information that reaches any one of the F-connections most likely reaches them all. It is rather through the weak ties and sporadic contacts that cross and link different coherent social groups that new and useful information becomes available (see also Constant et al 1996; Podolny and Baron 1997; Reagans and McEvily 2003). Remarkably, actors seem to receive crucial information from acquaintances whose very existence they have already forgotten (Granovetter 1970: 76-80). In exploring the significance of weak ties, Granovetter also refers to ‘marginal’ actors and ‘outsiders’ who seem to play a crucial role in the first phases of the diffusion of information and innovation (see, for example, also Rogers’ (1962) seminal innovation study and Burt’s (2004) findings about people near structural holes).

It seems to take only a small analytical step from Granovetter’s and Roger’s sociological notion of the ‘outsider’ to Park’s iconic ‘marginal man’ or Simmel’s emblematic ‘stranger’. And yet these personifications of urbanity hardly play a noticeable role in the accounts of the picturesque rural, at any rate non-metropolitan geographical settings of successful regional networks. The local, in other words, is rather portrayed in terms of the social cohesion of a village than of the diversity of a city. Rephrased in Ferdinand Tönnies’ (1887) terms, locality is seen as *Gemeinschaft* (community) rather than as *Gesellschaft* (society).

Economic geography due to its absorption with the F-connection-rich regional showcases, until more recently hardly appreciated the crucial importance of weak ties for innovation. Perhaps the strongest direct impact from economic sociology onto economic geography in this context arose from Uzzi’s (1996; 1997) instructive study of the New York garment industry. His research

corroborated that firm survival depends on a combination of ‘embedded’ and ‘arm’s length’ ties. Strong ties, phrased differently, are only beneficial in limited quantities after which point the insularity associated with maintaining close relationships turns into a liability (see also, for example, Rantisi 2002).

More recently, the strength of network ties appeared in the focus of economic geographic inquiry more broadly in the re-appraisal of trans-local ties. However, the straightforward scalar nesting of tie strength into a local/strong vs. global/weak-tie dichotomy reproduces the conceptual short-circuits of the regions-as-islands-of-innovation perspective. This simplistic mapping consequently provoked severe objections that deny a *causality* between spatial scale and density of ties (see, for example, Harris 1998; Allen 2000; Oinas 2000; Amin 2002; Ettliger 2003: 161; Gertler 2003: 84-86).

5 Small Worlds: the six-degrees-of-separation idea

The focus of social network analysis currently seems to move from the strength of ties towards the density and reach of network relations as the current interest in ‘small worlds’ (see Watts and Strogatz 1998; Watts 1999a, b; Barabasi 2002; Watts 2003) seems to indicate. The notion of the ‘small world’ builds on the seminal ‘six degrees of separation’-issue pioneered by Milgram (1967). Based on his experimental study of arbitrarily selected individuals in North America, Milgram was intrigued by the seeming fact that everybody was potentially linked to everybody else by only six relational moves in a chain of connections (see also Travers and Milgram 1969).

A first large-scale replication of Milgram’s experiment – encompassing 60,000 email users who were asked to reach 1 of 18 targets in 13 countries by forwarding messages to acquaintances -- suggested that Milgram’s surprising findings are remarkably robust (Dodds et al. 2003). The idea that we live in a ‘small world’ indeed has been popularized in the theatre (John Greene’s play, *Six Degrees of Separation*) and in entertainment (*The Kevin Bacon Game*), as well as applied to the studies of the world-wide web (Albert et al. 1999), scientific collaborations (Newman 2003), corporate board interlocks (Kogut and Walker 2001; Davis et al. 2003), and the evolution of biotechnology clusters (Casper and Murray 2005).

The notion of the ‘small world’ also yields conclusions for the understanding of our regional worlds. Firstly, ‘small worlds’ can be created by adding only a handful of remote links to a network where the level of local clustering is already high (that is, friends of friends are also friends). Thus, a small proportion of random ties added to several tightly cliqued local clusters can produce small-world effects. ‘Short cuts’ between local clusters and cliques minimize the average path length (Watts and Strogatz 1998) and thus allow resources to ‘hop’ from cluster to cluster (Uzzi and Spiro 2004). By emphasizing the huge impact of a few random ties, small worlds in an admittedly fairly wide interpretation are rather close to a generic understanding of urbanity that emphasizes accidental interaction and strangeness.

Secondly, while the idea of the ‘tertius’ emphasizes the arbitrage opportunities of a privileged network position, research on ‘small worlds’ has revealed the vulnerability of networks around these key positions. Networks have a tendency to create hubs and ‘aristocrats’ (Watts 1999a: 119), as these, on the one hand, provide (at least temporary) stability and increase efficiency. On the other hand, though, networks that are overly dependent on these ‘aristocrats’ are very much prone to

collapse if those central hubs are eliminated (Albert et al. 2000; on the critical role of hubs, see also Granovetter 2003). While this insight, particularly in this rather colloquial summary, might appear trivial, economic geography has hardly been concerned with the vulnerability of networks.

IV Promising turnings, risky intersections: rhizome, publics

Commenting on the social network approach Uzzi (1997: 63) has noted that Burt lays out an elaborate gridwork of social relations, but suppresses the social content underlying this structure: “It is often proposed [in social network analysis] that network structure alone virtually determines action. Burt’s foundational work takes this structural approach to its most natural conclusion: A network structure rich in structural holes is virtually all that is needed to induce information and resources to flow through the network like electric current through the circuit board”. The criticism of the apparent primacy of method over substance, network structure over contents, has perhaps been most vigorously voiced early on by Stinchcombe (1990: 381) in his discussion of interlocking directorates: “One has to build a dynamic and causal theory of a structure into the analysis of links ... We need to know what flows across the links, who decides on those flows in the light of what interests, and what collective or corporate action flows from the organization of links, in order to make sense of intercorporate relations”. This more established line of critique alludes to the need to juxtapose, balance and, where appropriate, even combine social network with governance approaches.

Despite their profoundly different views on relations, both approaches adhere to a network construal that is rooted in the basic topographic imagination of ties that link nodes, of social relationships that connect social actors (regardless if individuals, groups, or organizations). This, in principle, generic sociometric conception of networks has been challenged fundamentally by two imaginations which prominently problematize agency and actors and appreciate the multidimensionality of network rationalities and the multiplicity and fluidity of network relations.

1 From network to rhizome: Actor-Network Theory

The first alternative trope to the ties-and-nodes depiction is the rhizome, “the perfect word for network” (Latour 1999). Proposed by Deleuze and Guattari (1976; 1988) the rhizome metaphor also influenced the (later strands of) actor-network theory (ANT; Callon 1986; 1998; Latour 1987; 1999; Law 1992; Law and Hassard 1999). Networks seen through this perspective are an essentially heterogeneous reality made up of multidimensional and constantly evolving entanglements: “The rhizome is altogether different, a map and not a tracing,” Deleuze and Guattari (1988: 12) explicate, “The map is open and connectable in all dimensions; it is detachable, reversible, susceptible, to constant modification. It can be torn, reversed, adapted to any kind of mounting, reworked by any individual group, or social formation“.

In contrast to the rather clear-cut view on network formations in the governance and the social network approach, the rhizome offers “a new IMAGE of thought, one which thinks of the world as a network of multiple and branching roots ‘with no central axis, no unified point of origin, and no given direction of growth’” (Thrift 2000: 716). The botanical associations indeed seem intended (see also Hess 2004: 179): the metaphor of the rhizome foregrounds the transformative and

processual dimension of networks, it deliberately departs from the static views of the “transport without transformation” (Latour 1999: 15) in the dominant network approaches.

The rhizomatic understanding of multiple entanglements in ANT overgrows the established binary juxtapositions of structure/agency, subject/object, human/non-human: The capacity to act and give meaning to action is neither solely embodied in human actors nor localized in norms, values and institutions that make up our familiar registers of ‘social embeddedness’. Action rather takes place in ‘hybrid collectives’ (Callon and Law 1995) that entangle human actors as well as non-human actants in multiple ways. Tools, for example, are not just things that are used to achieve certain ends: “They contribute to the making of the universe of possibilities that make action itself” (Callon and Caliskan 2005: 18). Guns, to refer to a crass example of a tool, do not act themselves, i.e. shoot people. However, guns shape agency by affording a particular behavioral repertoire (Callon and Caliskan 2005: 18). In this perspective the rhizome also perforates the analytical distinction between practice and its scientific representation. The relational webs that constitute the economy, for example, not only comprise of the familiar catalogue of nodes such as firms, consumers, and various institutions – but also of the economists who contribute through calculative practices and conceptual tools to the performance of the reality they describe: The economy is embedded in economics (Callon 1998).

Although the rhizome-metaphor up to now has not diffused into economic geography on a similarly broad front as the tie-and-node imagery, it nevertheless exerts increasing influence on economic geographic imaginations of networks and space more generally, at least in four respects. Firstly, for (economic) geography the social network and governance approach offered a model for conceiving (or at least implicitly assuming) the fabrics of socio-economic life that could be assorted neatly onto different scalar levels (from local through regional to global); geographical notions of space themselves, though, remained largely untouched by this network imagery. ANT with its rhizome metaphor, in contrast, radically breaks away from the Euclidean scalar understanding to a genuine relational perception of space as topological stratifications (Murdoch 1998). ANT, in other words, reformulates and, partially, radicalizes the pleas against essentialist understandings of space and time (Massey 1997; 1999; Lee 2002: 340-1). In a rhizomatic or topological geography, “time-space consists of multiple pleats of relations stitched together” (Latham 2002: 131). Topology, as the “science of nearness and rifts” (Michel Serres, quoted in Murdoch 1998: 358) interweaves time and space with a heterogeneous network of actants that has been differentiated, for example, into regions, networks and fluid spaces (Mol and Law 1994).

Secondly, the perception of networks that perforated the established demarcations between human/non-human opened up novel avenues to delve into ‘hybrid geographies’ (Whatmore 2002), in which nature, for example, is no longer perceived as the traditional passive object but rather ascribed an acting role. Thirdly, by appreciating the multiplicity of interrelated processes in the constitution and reshaping of relational ties, ANT recently has inspired the de-homogenization of the supposedly lucid topographies of global commodity chains (Dicken et al. 2001; Coe et al. 2004) and of inter-personal networks that symptomatically interweave private and professional spheres (Ettlinger 2003; see also Latham 2002). Moreover, the rhizome has turned out to be a productive metaphor to differentiate Granovetter’s notion of embeddedness into societal, network and territorial embeddedness (Hess 2004).

2 Publics and polymorphous network domains: Harrison White

In a similar fashion as the metaphor of the rhizome dissolves pristine network graphs into an impervious maze, the notion of the publics seeks to blur and liquefy arithmomorphic notions of scale, boundary and structure of social relations. Whereas the rhizomatic geography of ANT, however, evolved (far) beyond the more established network traditions (and rather unfortunately seems to share the key word, if not the same notion), the idea of the publics in fact has been proposed by a key figure of the early social network analysis, Harrison White. In contrast to the French post-structuralist roots (or rather rhizome?) of ANT, the trained physicist White continues to draw on mathematical models and concepts (White 2002).

White starts his plea to break away from the clean boundaries between the private and the public, the micro and the macro, the local and the global with the fundamental observation that we “are creatures living within social goos, shards, and rubbery gels made up by and ourselves. We, like gels, may dissolve into different order under some heat. Even the frozen shards exhibit only limited orderliness, and even then an orderliness lacking in homogeneity, and an orderliness made more problematic through its dual relation to physical space” (White 1992: 337-338). The polymorphous character of social relations flows from the capacity of actors to maneuver across multiple social contexts by coupling and decoupling, that is tightening and loosening relational ties (see also White 2000: 125-126).

In White’s reasoning switching between different domains goes on in the social space of publics that ease actors into and out of both social times and social spaces. Publics decouple network-domains from each other (White 1995: 4), they provide “interstitial social spaces” characterized by short-term copresence as well as by intersections between multiple network domains. They function by reducing the uncertain and problematic nature of such spaces “by positing minimally recognizable identities, maximally decontextualized from the complex array of relations and story sets that each actor brings to the occasion” (Mische and White 1998: 705).

Publics thus are special moments or spaces of social opening that allow actors to switch from one setting to another. Such slippage presupposes a certain amount of disorder and incoherence or, in White’s terminology, ambage and ambiguity. Whereas ambiguity denotes the fuzziness of meanings and interpretations that facilitates the communication across different social contexts, ambage epitomizes a kind of instability, uncertainty, or polymorphology of ties and social roles which creates tendencies to switch from one relational setting to another. “Thus ambage is dual to ambiguity: fuzz in the concrete embodiment as opposed to fuzz in the rules of perception and interpretation” (White 1992: 107). Ambage, or “social roundaboutness” (Mische and White 1998: 710), suggests a kind of uncertainty and polymorphology in social roles, it suggests that actors embody multiple identities and capacities which allow them to switch from one set of ties to another, playing different roles and parts at once.

This deliberate appreciation of fuzz indeed resolutely swerves from the austere formalism of the social network approach. And yet this line of reasoning on slippage between relational ties afforded by ambage resonates with notions of entrepreneurial flexibility and arbitrage available to the tertius gaudens who occupies a privileged network position (Simmel 1902; Burt 1992). It also reverberates with the idea of ‘robust action’ and the idea that a single action can be coherent moves in many

games at once (Padgett and Ansell's (1993). In other words, although concealed by the dissident and idiosyncratic phrasing, White's reasoning reveals traces of the social network approach.

As mentioned earlier, White (1992: 197) also rejects the person as the basic and unquestioned elementary building block, the 'atom' as it were of social analysis. He insists that the "person should be a construct from the middle of the analysis, not a given boundary condition. Personhood has to be accounted for ..." (White 1992: 197). Each 'I' in the common parlance, he continues (page 198), "is a more or less rickety ensemble; it is firm and whole only temporarily as a facet of one particular constituent discipline energized in some situation and style". Persons, then, are not necessarily the governors of network relations, but are nodes of story condensation and identity that occur at the interface between multiple networks. Identities thus, in White's very own terminology, are emergent properties in publics (see also Ikegami 2000).

Although White's notion of the fluid relational spaces of publics seems to offer yet another imagination to break away from the one-dimensionality of the dominant network view, geographic inquiry so far has stayed clear from this construal. At the disciplinary boundaries between economic sociology and economic geography, the potentials of this approach have been indicated, in a rare application, in the conception of the fluid connectivity enabled by mobile communication technologies (Sheller and Urry 2003). Mobile telephony creates a sort of mobile 'public' that "exponentially multiplies the possibilities for easing in and out of contingent socialities and picking up the multiple story lines through which identities are constituted. [...] Persons themselves are not simply stationary nodes in a network, but are flexible constellations of identities-on-the-move" (Sheller 2004: 49).

V The very rough guide: Travel suggestions, warnings, practical advice

1 On the trading route: approach strangers self-confidently

This paper set out for an expedition to map the conceptual terrain on which the notion of networks travelled between economic sociology and economic geography. The map that emerged in the course of this geographical exercise is dominated by a thick trading route, the governance highway, so to speak. Exchange along this route replicated symptomatic features of the trade of economic geography with other disciplines (see also Peck 2005). Firstly, although this trading route was by no means a one-way, cross-disciplinary exchange was rather asymmetrical, albeit at varying degrees. Whereas the negative trade balance of economic geography appears relatively steep in debates on strategic and project networks, research on informal networks and even more so on regional networks crossed disciplinary boundaries more easily. Secondly, economic geography, on balance, imported conceptual building blocks in exchange for empirical accounts (see Sydow 2003: 302-3).

Finally, particularly in the case of regional networks, undoubtedly our major recent 'export success', trade along the governance route augmented a reification of the prevailing construal of networks in economic geography as homogenous and universally beneficial 'strong-ties'. On the other side of the boundary, this 'export success' stabilized sociological perceptions of regional networks in their iconic incarnation of industrial districts as coherent local entities. Trade, as political economy has taught us already, in fact is not an unequivocally beneficial affair.

In drawing this sobering account I do not intend to suggest that this trading route has turned into a dead-end. Far from being exhausted, the governance approach can carry economic geographic reasoning on networks farther on. In sticking to this trading route we might, however, reconsider the ‘terms of the trade’. The increasing spatial awareness in the social sciences (Grabher and Hassink 2004), as manifest in debates on the resilience of national institutions (see, for example, Hall and Soskice 2001) or the micro-geography of the epistemic communities of laboratories (see, for example, Knorr-Cetina 1999) the conditions in principle seem favorable. However, instead of clinging on the proper spatial scale to these phenomena and to the dish familiar narratives on topographical networks, economic geography might inflict a more challenging problematization of space onto the social sciences, one that seeks to grasp the interdependencies between topographical and topological space. There are reasonable concerns that economic geography already has missed (not just) one boat in influencing essential spatial debates (Dicken 2004); there are also a few rare examples of a successful imposition of more demanding perception of space to our academic neighbors (Amin and Cohendet 2004).

2 Leave the main trading route: consider the bypasses

Beyond the main trading route of the governance approach the vast area of the social network approach remained largely untouched by economic geography. Apart from fairly loose interpretations of the strength of network ties, economic geography did hardly engage in the systematic inquiry of network structures and positions. Why venture deeper into these areas that rather tenaciously have been bypassed? Whereas notions of ‘small worlds’ (Watts 1999) and ‘structural equivalence’ (Burt 1987) challenge our cohesion-oriented assumptions of innovation and diffusion, concepts like ‘tertius gaudens’, ‘structural holes’ (Burt 1978, 1992) or ‘robust action’ (Padgett and Ansell 1993) imply that arbitrage, strategizing, even opportunistic behavior might not be limited to some deviant ‘dark networks’ (Raab and Milward 2003) but rather represent behavioral options leveraged off from ordinary network configurations and positions. On a more general level, social network analysis offers a repertoire of tools to conceptualize economic processes such as entrepreneurship and innovation in network terms. Networks in social network analysis, in other words, are not the counter-world to markets, they fundamentally *are* markets (see also Baker 1984; White 1992b, 2002). Instead of incessantly reassuring ourselves that the economic is embedded in the social, we might move on to further substantiate the proposition that economic action, rather than being socially embedded, *is* fundamentally social (see, for example, Lee 2002).

In fact, the notion of embeddedness, against its very intentions, seems to have reaffirmed Talcott Parson’s (1935 a,b) pact between sociology and economics that relinquished the determination of the economic to economists while sociology’s chief concern lie in the realm of norms, values, institutions (see also Stark 2000). Do you spot economic geography in this picture? Yes, indeed, economic geography up until more recently appeared mainly committed to the program to place the economic in the familiar register of conventions, traditions and institutions that make up the (spatial) context (Peck 2005). The point here, of course, is not to make the case for a wholesale shift from the concerns with the context to the analysis of network structure. The challenge lies rather in exploring imaginative ways to explore the interdependencies between accounts on structure and context. Promising directions for this route have already been indicated in economic sociology particularly in small-world inspired research (for example, Uzzi and Spiro 2004; Casper and Murray 2005; Powell et al. 2005).

3 At risky intersections: remember a way back

Eventually, our mapping exercise identified some risky intersections that, despite some blind corners, also open access to promising new areas. A most dramatic shift in direction is involved in moving away from the tie-and-node trope towards the metaphor of the rhizome (Deleuze and Guattari 1976). Economic geography has already started to venture in this direction towards a topological understanding of space and a multidimensional view on networks (see, for example, Murdoch 1998; Thrift 2000; Dicken et al. 2001; Latham 2002). Where else to turn to explore the conceptual space of ANT?

Economic geography has yet to more systematically scout out the implications – and the limitations -- of breaking away from the dichotomies of structure/agency, subject/object, human/non-human structure/agency for the study of the economic. For economic geography the proposition that action takes place in ‘hybrid collectives’ (Callon and Law 1995) would imply to more systematically appreciate the materiality of the economic. Studies of financial markets, for example, have exemplified the entanglements of actors with tools, instruments, technical devices, artifacts, or algorithms in an instructive fashion. Computer monitors that are used to ‘screen’ the markets are the very locations of markets on which trading is performed (Knorr-Cetina and Bruegger 2002). Does not geography have a noteworthy tradition in studying the material world -- and thus could contribute to a “science of associations” (Beunza and Stark, 2004: 370)?

The rhizome thus can perforate analytical demarcations that have become ‘naturalized’ in our prevailing lines of reasoning in a productive fashion. For this very reason, in fact, the rhizome can turn also into a trap when all too arbitrarily transplanted in any context (see Haraway 1997). ANT-inspired studies tend to privilege the relational dimensions of the web at the expense of considerations of the actors themselves (see also Dicken et al. 2001: 105). They are, put bluntly, strong on ties but weak on nodes. Whereas economic geography, quasi in the mirror image, privileges actors by rather implicitly assuming some form of generic relations between them, ANT seems to invite to glance over the differences between distinct types of actors in different domains and thereby also conceals uneven power relations. Although power (in its Foucauldian understanding) by no means is an alien concept to ANT in principle, in practice “ANT misses that hierarchies are real” (Ettlinger 2003: 157).

Harrison White’s path towards a polymorphous notion of networks problematizes the roles and identities of actors in a more explicit fashion. The identity of the individual actors only temporary crystallizes in publics in which different network domains overlap and intersect. The analytic strategy of conceiving identities as a ‘rickety ensemble’ (White 1992b: 198) appears particularly useful in transient and temporary contexts, like project-based environments for example. In such fluid contexts actors no longer simply have to relate to a single anchor of identity, that is the firm, but to a widening spectrum of competing sources of relational loyalties like the firm, a portfolio of projects and the individual self-conception as an entrepreneur (see, for example, Alvesson 2000; Swart, Kinnie and Purcell 2003).

Following White’s path, inevitably, is not without its difficulties. In parts, the path appears difficult to access due to its idiosyncratic depiction in White’s own writing and the interferences within a truly colourful spectrum of metaphors. More critically though, White’s notions of the publics and polymorphous network domains, similar to the rhizome-metaphor, provide a potent catalyst to

unfreeze our static and sterile network portrayals; they are less powerful in conceiving the analytical differences between different processes occurring between and within different network domains. Both approaches are, in short, more convincing as advice to leave the trodden paths than in specifying in detail the ways ahead. While the exploration of the rhizome metaphor, however, demands to venture resolutely further into alien terrain and thus discontinues the trade with dominant traditions in economic sociology, White's path remains closer to proven terrain: in fact, it can be (re-)connected with established trails that have not yet been fully explored by economic geography. Following White's path allows us, in step one, to unlock the actors from the rigid grid of homogenous ties and to place them in the fluid context of polymorphous domains. Re-connecting to proven terrain in step two, these domains can be perceived as a spectrum ranging from the indeed familiar strong ties with more strategic and calculative relationships, Burt-ties if you like, and the thin and ephemeral ties at the neglected weak-tie end of Granovetter's spectrum (see, for example, Wittel 2001; Grabher 2004).

The paper, though, does not end with an emphatic 'this way!' The paper, first and foremost seeks to provide a map and not a guide. There is no single one best way to definitely determine the true essence of networks in a once-and-for-all manner but multiple paths to construe different types and accentuate different dimensions of networks (Dicken 2004: 10-11). By drawing this map on cross-disciplinary exchange and mutual ignorance I wanted, however, to direct our attention to exciting terrain that economic geography so far stayed clear. The paper tried to motivate to venture into that territory, at the very least, it illuminated for a moment what we opted against so far.

References

- Abolafia, M.** 1997: *Making markets*. Cambridge, MA: Harvard University Press.
- Albert, R., Jeong, H. and A.L. Barabási.** 1999: Diameter of the World Wide Web. *Nature* 401, 130-31.
- _____ 2000: Attack and error tolerance in complex networks. *Nature* 406, 378-382.
- Alderman, N.** 2002: *Temporary clusters innovation in low volume capital project networks: on the temporality of clustering*. Paper presented at the Future of Innovation Studies Conference, Eindhoven.
- Allen, J.** 2000: Power/economic knowledges: symbolic and spatial formations. In Bryson, J., Daniels, P.W., Henry, N. and J. Pollard, editors, *Knowledge, space, economy*. London: Routledge, 15-33.
- Alvesson, M.,** 2000. Social identity and the problem of loyalty in knowledge-intensive companies. *Journal of Management Studies* 37(8), 1101-1123.
- Amin, A.,** 2002: Spatialities of globalization. *Environment and Planning A* 34(3), 385-99.
- Amin, A. and Cohendet, P.** 2004: *Architectures of knowledge: Firms, capabilities and communities*. Oxford: Oxford University Press.
- Amin, A. and Hausner, J.** 1997: *Beyond market and hierarchy: Interactive governance and social complexity*. Aldershot: Edward Elgar.
- Amin, A. and Thrift, N.** 1992: Neo-Marshallian nodes in global networks. *International Journal of Urban and Regional Research* 16, 571-87.
- Arlachi, P.** 1986: *Mafia business: The mafia ethic and the spirit of capitalism*. London: Verso.
- Asunama, B.** 1985: The organization of parts purchases. *Japanese Economic Studies* Summer, 32-53.
- Axelrod, R.** 1984: *The evolution of cooperation*. New York: Basic Books.
- Baker, W.E.** 1984: The social structure of a national securities market. *American Journal of Sociology* 89, 775-811.
- Baker, W. E. and Faulkner, R. R.** 1993: The social organization of conspiracy: Illegal networks in the heavy electrical equipment industry. *American Sociological Review* 58, 837-860.
- Barbási, A.L.** 2002: *Linked: The new science of networks*. Cambridge, MA: Perseus.

Bathelt, H., Maskell, A. and P. Malmberg 2004: Clusters and knowledge: Local buzz, global pipelines and the process of knowledge-creation. *Progress in Human Geography* 28, 31-56.

Becattini, G. 1978: The development of light industry in Tuscany: An interpretation. *Economic Notes* 2(3), 107-23.

Ben-Porath, Y. 1980: The F-Connection: Families, friends, and firms in the organization of exchange. *Population and Development Review* 6, 1-30.

Beaverstock, J.V. 2005: Transnational elites in the city: British highly-skilled inter-company transferees in New York City's financial district. *Journal of Ethnic and Migration Studies* 31(2), 245-268.

Beunza, D. and Stark, D. 2004: Tools of the trade: The socio-technology of arbitrage in a Wall Street trading room. *Industrial and Corporate Change* 13(1), 369-401.

Blomquist, T. and Packendorff, J. 1998: Learning from renewal projects: content, context and embeddedness. In R. A. Lundin and C. Midler, editors, *Projects as arenas for renewal and learning processes*, Boston, Dordrecht, London: Kluwer Academic Publishers.

Boltanski, L. and Chiapello, E. 1999: *Le nouvel Esprit du Capitalisme*. Paris: Gallimard.

Bradach, J.L. and Eccles, R. 1989: Price, authority, and trust. *Annual Review of Sociology* 15, 97-118.

Bresnahan, T., Gambardella, A. and A. Saxenian 2001: Old economy' inputs for 'new economy' outcomes: cluster formation in the new Silicon Valleys. *Industrial and Corporate Change* 10(4), 835-860.

Brown J. S. and Duguid, P. 1991: Organizational learning and communities of practice. *Organization Science* 2, 40-57.

Brusco, S. 1982: The Emilian model: Productive decentralization and social integration. *Cambridge Journal of Economics* 6, 167-84.

Bunnell, T.G. and Coe, N.M. 2001: Spaces and scales of innovation, *Progress in Human Geography* 25(4), 569-89.

Burkhardt, M. E. 1994: Social interaction effects following a technological change: A longitudinal investigation. *Academy of Management Journal* 37, 869-898.

Burt, R. S. 1978: Cohesion versus structural equivalence as a basis for network sub-groups. *Sociological Methods and Research* 7, 189-212.

_____ 1980: Models of network structure. *Annual Review of Sociology* 6, 79-141.

_____ 1986. Comment. In Lindenberg, S., Coleman, J. and S. Nowak, editors, *Approaches to social theory*, New York: Russell Sage Foundation, 105-7.

_____ 1987: Social contagion and innovation: Cohesion versus structural equivalence. *American Journal of Sociology* 92, 1287-1335.

_____ 1992: *Structural holes*. Cambridge, MA: Harvard University Press.

_____ 2000: The network structure of social capital. In Staw, B.M. and Sutton, R.I., editors, *Research in organizational behavior* 22, 345-431. Greenwich, CT: JAI Press.

_____ 2004: Structural holes and good ideas. *American Journal of Sociology* 110(2), 349-99.

Callon, M. 1986: The sociology of an actor-network: The case of the electric vehicle. In M. Callon, J. Law and A. Rip, editors, *Mapping the dynamics of science and technology*, London: Macmillan, 19-34.

Callon, M. and **Law, J.** 1995: Agency and the hybrid collectif. *The South Atlantic Quarterly* 94(2), 481-508.

Callon, M. 1998: *The Laws of the market*, Oxford: Blackwell.

Callon, M. and **Caliskan, K.** 2005: *New and old directions in the anthropology of markets*. Paper presented at the Conference New Directions in the Anthropology of Markets, New York University, April 5, 2005.

Camagni, R. 1991: *Innovation networks: spatial perspectives*. Belhaven Press: London.

Casper, S. and **Murray, F.** 2005: *Careers and clusters: Analyzing the career network dynamic of biotechnology clusters*. Paper presented at the International Workshop Knowledge Networks, Innovation and Employment Relations, Brunel University, January 13-14, 2005.

Castells, M. 1996: *The information age: Economy, society and culture 1: The rise of the network society*. Oxford: Blackwell.

Coase, R. 1937: The nature of the firm. *Economica* 4, 386-405.

Coe, N.M. and **Bunnell, T.G.** 2003: Spatializing' knowledge communities: towards a conceptualization of transnational innovation networks. *Global Networks* 3(4), 437-456.

Coe, N.M., Hess, M., Yeung, H. W.-C., Dicken, P. and **J. Henderson** 2004: Globalizing regional development: A global production networks perspective. *Transactions of the Institute of British Geographers* 29(4), 468-485.

Constant, D., Sproull, L. and **S. Kiesler** 1996: The kindness of strangers: On the usefulness of weak ties for technical advice. *Organization Science* 7, 119-135.

- Coleman, J.S.** 1988: Social capital in the creation of human capital. *American Journal of Sociology* 94, 95-120.
- Crang, P., Dwyer, C. and P. Jackson** 2003: Transnationalism and the spaces of commodity culture. *Progress in Human Geography* 27, 438-56.
- Dalton, M.** 1959: Power struggles in the line. In Dalton, M., editor, *Men Who Manage*. New York: Wiley, 71-109.
- Davies, A. and Hobday, M.** 2005: *The Business of projects: Managing innovation in complex products and systems*. Cambridge: Cambridge University Press.
- Davis, G.F., Yoo, M. and W.E. Baker** 2003: The small world of the American corporate elite, 1982-2001. *Strategic Organization* 1, 301-326.
- Della Porta, D. and Vannucci, A.** 1999: *Corrupt exchanges: Actors, resources and mechanisms of political corruption*. New York: Aldine de Gruyter.
- DeFillippi, R. and Arthur, M.** 1998: Paradox in project-based enterprise. *California Management Review* 40(2), 125-138.
- DeFillippi, B., Lindkvist, L. and J. Sydow** 2004: Project organizations, embeddedness and repositories of knowledge. *Organization Studies* Special Issue 25(9).
- Deleuze, G. and Guattari, F.** 1976: *Rhizome*. Paris: Minuit.
- _____ 1988: A thousand plateaus. Capitalism and schizophrenia. London: Athlone.
- Dicken, P. and Thrift, N.** 1992: The organization of production and the production of organization. *Transactions Institute of British Geographer* 17, 279-91.
- Dicken, P.** 2003: *Global shift: Reshaping the global economic map in the 21st century*. New York: Guildford.
- Dicken, P., Kelly, P.P., Olds, K. and H. W.-C. Yeung** 2001: Chains and networks, territories and scales: Towards a relational framework for analysing the global economy. *Global Networks* 1(2), 89-112.
- Dicken, P.** 2004: Geographers and 'globalization': (yet) another missed boat? *Transactions of the Institute of British Geographers* 29, 5-26.
- Dillon, M.** 2002: Network society, network-centric warfare and the state of emergency. *Theory, Culture and Society* 19(4), 71-79.
- Dodds, P.S., Muhamad, R. and D.J. Watts** 2003: An experimental study of search in global social networks. *Science* 301, 827-829.

Ekstedt, E., Lundin, R.A., Söderholm, A. and H. Wirdenius 1999: *Neo-industrial organising. Renewal by action and knowledge in a project-intensive economy*. London: Routledge.

Emirbayer, M. and Goodwin, J. 1994: Network analysis, culture, and the problem of agency. *American Journal of Sociology* 99(6), 1411-1454.

Engwall, M. 2003: No project is an island: linking projects to history and context. *Research Policy* 32, 789-808.

Ettlinger, N. 2003: Cultural economic geography and a relational and microspace approach to trusts, rationalities, networks, and change in collaborative workplaces. *Journal of Economic Geography* 3, 145-171

Ettlinger, N. and Bosco, F. 2004: Thinking through networks and their spatiality: A critique of the US (public) war on terrorism and its geographic discourse. *Antipode*, 249-271.

Friman, H.R. 2004: The great escape? Globalization, immigrant entrepreneurship and the criminal economy. *Review of International Political Economy* (11)1, 98-131.

Galaskiewicz, J. and Burt, R. 1991: Interorganizational contagion in corporate philanthropy. *Administrative Science Quarterly* 36, 88-105.

Gambetta, D. 1988: Mafia: The price of distrust. In Gambetta, D., editor, *Trust*. Oxford: Blackwell, 158-175.

Gann, D.M. and Salter, A.J. 2000: Innovation in project-based, service-enhanced firms: The construction of complex products and systems. *Research Policy* 29, 955-972.

Geertz, C. 1978: The Bazaar economy. *American Economic Review* 68, 28-32.

Gertler, M.S. 1995: 'Being there': Proximity, organization, and culture in the development and adoption of advanced manufacturing technologies. *Economic Geography* 71, 1-26.

_____ 2003: Tacit knowledge and the economic geography of context, or the undefinable tacitness of being (there). *Journal of Economic Geography* 3, 75-99.

Ghoshal, S. and Bartlett, C. 1990: The multinational corporation as an interorganizational network. *Academy of Management Review* 15, 561-585.

Gomes-Casseres, B. 1996: *The alliance revolution: The new shape of business rivalry*. Cambridge, MA: Harvard University Press.

Goodman, R.A. and Goodman, L.P. 1976: Some management issues in temporary systems: A study of professional development of manpower - the theatre case. *Administrative Science Quarterly* 21, 494-501.

Grabher, G. 1993a: Rediscovering the social in the economics of interfirm relations. In Grabher, G., editor, *The embedded firm*, London: Routledge, 1-33.

_____ 1993b: The weakness of strong ties: the lock-in of regional development in the Ruhr area. In Grabher, G., editor, *The embedded firm*, London: Routledge, 255-77.

_____ 2002a: Cool projects, boring institutions: Temporary collaboration in social context. In Grabher, G., editor, Production in projects: Economic geographies of temporary collaboration, *Regional Studies Special Issue* 36(3), 205-14.

_____ 2002b: The project ecology of advertising: Tasks, talents, and teams. In Grabher, G., editor, Production in projects: Economic geographies of temporary collaboration, *Regional Studies Special Issue* 36(3), 245-62.

_____ 2004: Temporary architectures of learning: knowledge governance in project ecologies. *Organization Studies Special Issue Project Organizations, Embeddedness and repositories of knowledge* 25(9), 1491-1514.

Grabher, G. and Hassink, R. 2003: Fuzzy concepts, scanty evidence, policy distance? Debating Ann Markusen's assessment of critical regional studies. *Regional Studies* 37(6/7), 699-700.

Grabher, G. and Hassink, R. 2004: Going places: Towards a spatial turn in the social sciences? SECONS Discussion Forum No. 2, Socio-Economics of Space, University of Bonn (<http://www.giub.uni-bonn.de/grabher/>)

Grabher, G. and Powell, W.W. 2004: Exploring the webs of economic life. In Grabher, G. and Powell, W.W., editors, *Networks*. Cheltenham: Edward Elgar (Critical Studies Economic Institutions Series), 1-36.

Granovetter, M.S. 1970: *Changing jobs: Channels of novelty information in a suburban community*. Doctoral dissertation, Harvard University.

_____ 1973: The strength of weak Ties. *American Journal of Sociology* 78, 1360-80.

_____ 1974: *Getting a job*. Cambridge, MA: Harvard University Press.

_____ 1985: Economic action and social Structure: The Problem of Embeddedness. *American Journal of Sociology* 91, 481-501.

_____ 1995: Coase revisited: Business groups in the modern economy. *Industrial and Corporate Change* 4(1), 93-130.

_____ 2003: Ignorance, knowledge, and outcomes in a small world. *Science* 301, 773-4.

Hagedoorn, J. 2002: Inter-firm R&D partnerships: An overview of major trends and patterns since 1960. *Research Policy* 31, 477-92.

Håkansson, H. and **Johanson, J.** 1988: Formal and informal cooperation strategies in international industrial networks. In Contractor, J. F. and Lorange, P., editors, *Cooperative strategies in international business*, Lexington: Lexington Books, 369-79.

Hall, P.A. and **Soskice, D.**, editors, 2001: *Varieties of capitalism: The institutional foundations of comparative advantage*. Oxford: University Press.

Haraway, D. 1997: *Modest_Witness@Second_Millennium.FemaleMan©_Meets_OncoMouseTM*. London: Routledge.

Harris, S.J. 1998: Long-distance corporations, big sciences, and the geography of knowledge. *Configurations* 6(2), 269-304.

Hedlund, G. 1986: The hypermodern MNC: A heterarchy? *Human Resource Management* 25(1), 9-35.

_____ 1993: Assumptions of hierarchy and heterarchy, with application to the management of the multinational corporation. In Ghoshal, S. and Westney, O. E., editors, *Organization theory and the multinational corporation*, New York: Free Press, 211-236.

Helper, S. 1993: An exit-voice analysis of supplier relations: The case of the US automobile industry. In Grabher, G., editor, *The embedded firm*, London: Routledge, 141-160.

Helper, S., MacDuffie, J.P. and **Sabel, C.** 2000: Pragmatic collaborations: Advancing knowledge while controlling opportunism. *Industrial and Corporate Change* 9(3), 443-87.

Hennart, J.F. 1993: Explaining the swollen middle: Why most transactions are a mix of 'market' and 'hierarchy'. *Organization Science* 4, 529-547.

Herrigel, G.B. 1993: Power and the redefinition of industrial districts. In Grabher, G., editor, *The embedded firm*. London: Routledge, 227-251.

_____ 1996: *Industrial constructions: The sources of German industrial power*. New York: Cambridge University Press.

Hess, M. 2004: 'Spatial' relationships? Towards a reconceptualization of embeddedness. *Progress in Human Geography*, 28(2), 165-186.

Hudson R. 1999: The learning economy, the learning firm and the learning region: a sympathetic critique of the limits to learning. *European Urban and Regional Studies* 6(1), 59-72.

Ikegami, E. 2000: A sociological theory of publics: Identity and culture as emergent properties in networks. *Social Research* 67, 989-1029.

Jarillo, J.C. 1988: On strategic networks. *Strategic Management Journal* 9(1), 31-41.

- Johanson, J. and Mattson, L.G.** 1987: Interorganizational relations in industrial systems: A network approach compared with the transaction-cost approach. *International Studies of Management and Organization* 17(1), 34-48.
- Kaplan, D.H.** 1998: Geographical aspects of ethnic economies. *Urban Geography* 19(6), 487-488.
- Kenney, M.**, editor, 2000: *Understanding silicon valley: The anatomy of an entrepreneurial region*. Stanford, CA: Stanford University Press.
- Knorr-Cetina, K.** 1999: *Epistemic cultures: how the sciences make knowledge*. Cambridge. Cambridge University Press.
- Knorr-Cetina, K. and Bruegger, U.** 2002: Global microstructures: the virtual societies of financial markets. *American Journal of Sociology* 107(4), 905-950.
- Kogut, B. and Walker, G.** 2001: The small world of Germany and the durability of national networks. *American Sociological Review* 66(3), 317-35.
- Krippner, G.** 2001: The elusive market: Embeddedness and the paradigm of economic sociology. *Theory and Society* 30, 775-810.
- Legendijk, A.** 2001: Three stories about regional salience: 'regional worlds', 'political mobilisation', and 'performativity'. *Zeitschrift für Wirtschaftsgeographie* 45(3-4), 139-58.
- Lane, C. and Bachmann, R.** 1997: Cooperation in inter-firm relations in Britain and Germany: The role of social institutions. *British Journal of Sociology* 48, 226-254.
- Latham, A.** 2002: Retheorizing the scale of globalization: Topologies, actor-networks, and cosmopolitanism. In Herod, A. and Wright, M.W., editors, *Geographies of power, placing scale*, Oxford: Blackwell, 115-44.
- Latour, M.** 1987: *Science in action*. Cambridge, MA: Harvard University Press.
- _____ 1988: *The Pasteurization of France*. Cambridge, MA: Harvard University Press.
- _____ 1999: On recalling ANT. In Law, J. and Hassard, J., editors, *Actor-network theory and after*. Oxford: Blackwell, 15-15.
- Laumann, E.O.** 1979: Network analysis in large social systems: Some theoretical and methodological Problems. In Holland, P.W. and Leinhard, S., editors, *Perspectives in social network research*, New York: Academic Press.
- Law, J.** 1992: *Notes on the theory of the actor-network: Ordering, strategy and heterogeneity*. Department of Sociology and the Centre for Science Studies, Lancaster University.
- Law, J. and Hassard, J.** 1999: *Actor-network theory and after*. Oxford: Blackwell.

Lazerson, M., 1993: Factory or putting-out? Knitting networks in Modena. In Grabher, G., editor, *The embedded firm*, London: Routledge, 203-226.

Lee, R. 2002: 'Nice maps, shame about the theory'? Thinking geographically about the economic. *Progress in Human Geography* 26(3), 333-355.

Leitner, H., Pavlik, C. and E. Sheppard 2002: Networks, governance, and politics of scale: Inter-urban networks and the European Union. In Herod, M. and Wright, M. W., editors, *Geographies of power, placing scale*, Oxford: Blackwell, 274-303.

Leyshon, A. and Thrift, N. 1997: *Money/space: geographies of monetary transformation*. London: Routledge.

Light, I. 1972: *Ethnic enterprise in America*. Berkeley: University of California Press.

_____ 1998: Afterword: Maturation of the ethnic economy paradigm. *Urban Geography* 19(6), 577-581.

Lorenzoni, G. and Baden-Fuller, C. 1995: Creating a strategic center to manage a web of partners. *California Management Review* 37(3), 146-63.

Lorrain, F. and White, H.C. 1971: The structural equivalence of individuals in social networks. *Journal of Mathematical Sociology* 1, 49-80.

Lundin, R.A. and Söderholm, A. 1995: A Theory of temporary organization. *Scandinavian Journal of Management* 11, 437-55.

Macneil, I.R. 1974: The many futures of contract. *Southern California Law Review* 47, 691-816.

Malmberg, A. and Maskell, P. 2002: The elusive concept of localization economies: Towards a knowledge-based theory of spatial clustering. *Environment and Planning A* 34, 429-49.

Malmberg, A. and Maskell, P. 2003: Localised capabilities and industrial competitiveness. In Öhman, J. and Simonsen, K., editors, *Voices from the north. New trends in nordic human geography*, Aldershot: Ashgate, 11-28.

Markusen, A. 1999: Fuzzy concepts, scanty evidence, policy distance: The case for rigor and policy relevance in critical regional studies. *Regional Studies* 33, 869-884.

Massey, D. 1979: In what sense a regional problem? *Regional Studies* 17, 233-243.

_____ 1997: Economic/Non-economic. In Lee, R. and Wills, J., editors, *Geographies of Economies*. New York: Arnold.

_____ 1999: Spaces of politics. In Massey, D., Allen, J. and P. Sarre, editors, *Human Geography Today*, Cambridge: Polity Press, 279-94.

- McDowell, L.** 1997: *Capital culture: Gender at work in the city*. London: Blackwell.
- Merton, R.K.** 1957: *Social theory and social structure*. New York: The Free Press.
- Meyerson, D., Kramer, R. and K.E. Weick** 1996: Swift trust and temporary groups. In Kramer, R. and Tyler, T., editors, *Trust in organizations*, London: Sage, 166-95.
- Milgram, S.** 1967: The small-world problem. *Psychology Today* 1, 61-67.
- Mische, A. and White, H.** 1998: Between conversation and situation: Public switching dynamics across network domains. *Social Research* 65(3), 698-724.
- Mizruchi, M.S.** 1994: Social network analysis: Recent achievements and current controversies. *Acta Sociologica* 37(4), 329-343.
- Mol, A. and Law, J.** 1994: Regions, networks and fluids: Anaemia and social topology. *Social Studies of Science* 24, 641-71.
- Moreno, J.L.** 1934: *Who shall survive?* Washington, DC: Nervous and Mental Disease Publishing Company.
- Murdoch, J.** 1998: The spaces of actor-network theory. *Geoforum* 29, 357-74.
- Nee, V., Sanders, J. and S. Sernau** 1994: Job transition in an immigrant metropolis: ethnic boundaries and the mixed economy. *American Sociological Review* 59(6), 849-72.
- Newman, M.** 2003: The structure and function of complex networks. *SIAM Review* 45, 167-256.
- Oinas, P.** 1997: On the socio-spatial embeddedness of business firms. *Erdkunde* 5, 23-32.
- _____ 1999: Voices and silences: the problem of access to embeddedness. *Geoforum* 30, 351-361.
- Oinas, P.** 2000: Distance learning: Does proximity matter? In Boekema, F., Morgan, K., Bakkers, S. and R. Rutten, editors, *Knowledge, innovation and economic growth*, Aldershot: Edward Elgar, 57-73.
- Oliver, A.L. and Ebers, M.** 1998: Networking network studies: An analysis of conceptual configurations in the study of inter-organizational relationships. *Organization Studies* 19(4), 549-583.
- Owen-Smith, J. and Powell, W.W.** 2004: Knowledge networks as channels and conduits: the effects of spillovers in the Boston biotechnology community. *Organization Science* 15(1), 5-21.
- Padgett, J.F. and Ansell, C.** 1993: Robust action and the rise of the Medici, 1400-34. *American Journal of Sociology* 98, 1259-1319.

Parsons, T. 1935a : Sociological elements in economic thought I. Historical. *Quarterly Journal of Economics* 49, 414-53.

_____ 1935b: Sociological elements in economic thought II. The analytical factor view. *Quarterly Journal of Economics* 49, 646-67.

Peck, J. 2005: Economic sociologies in space. *Economic Geography* 5, 127-176.

Piore, M. and Sabel, C. 1984: *The second industrial divide*. New York: Basic Books.

Podolny, J.M. and Baron, J.N. 1997: Relationships and resources: Social networks and mobility in the workplace. *American Sociological Review* 62, 673-693.

Podolny, J.M. and Page, K.L. 1998: Network forms of organization. *Annual Review of Sociology* 24, 57-76.

Podolny, J.M. 2001: Networks as the pipes and prisms of the market. *American Journal of Sociology* 107, 33-60.

Polanyi, K. 1973: *The great transformation*. New York: Octagon Books.

Portes, A. and Bach, R. 1985: *Latin journey: Cuban and Mexican immigrants in the United States*. Berkeley and Los Angeles: University of California Press.

Powell, W.W. 1990: Neither market nor hierachy: Network forms of organization. *Research in Organizational Behaviour* 12, 295-336.

Powell, W.W., White D., Koput, K.W. and J. Owen-Smith 2005: Network dynamics and field evolution: The growth of interorganizational collaboration in the life sciences. *American Journal of Sociology* 110(4), 1132-1205.

Putnam, R. 1993: *Making democracy work: Civic traditions in modern Italy*. Princeton, NJ: Princeton University Press.

Pyke, F., Becattini, G. and W. Sengenberger 1990: *Industrial districts and interfirm cooperation in Italy*. Geneva: International Institute for Labor Studies.

Raab, J. and Milward, H.B. 2003: Dark networks as problems. *Journal of Public Administration Research and Theory* 13, 413-439.

Rantisi, N.M. 2002: The local innovation system as a source of variety: Openness and adaptability in New York City's garment district. *Regional Studies* 36(6), 587-602.

Reagans, R. and McEvelly, B. 2003: Network structure and knowledge transfer: the effects of cohesion and range. *Administrative Science Quarterly* 28, 240-267.

Reinmoeller, P. 2003: *Routine, cluster, and institutional context: analyzing the dynamic capabilities of project organizations*. Paper presented at the 19th EGOS Colloquium, Copenhagen Business School, 3-5 July 2003.

Richardson, G.B. 1972: The organization of industry. *Economic Journal* 82, 883-96.

Rogers, E.M. 1962: *Diffusion of innovations*. New York: Free Press.

Roy, D. 1954: Efficiency and 'the fix': informal intergroup relations in a piecework machine shop. *American Journal of Sociology* 60, 255-67.

Sako, M. and Helper, S. 1998: Determinants of trust in supplier relations. *Journal of Economic Behavior and Organization* 34, 387-417.

Sanders, J.M. and Nee, V. 1996: Immigrant self-employment: The family as social capital and the value of human capital. *American Sociological Review* 61, 231-249.

Sassen, S. 2002: Global cities and diasporic networks: Microsites in global civil society. In Anheier, H., Glasius, M. and M. Kaldor, editors, *Global civil society 2002*, Oxford: Oxford University Press, 217-38.

Saxenian, A. 1994: *Regional advantage: Culture and competition in Silicon Valley and Route 128*. Cambridge, MA: Harvard University Press.

_____ 2000: Inside-out: Regional networks and industrial adaptation in Silicon Valley and Route 128. In Granovetter, M. and Sweedberg, R., editors, *The sociology of economic life*, New York: Westview Press, 357 -75.

Scott, A. 1998: *Regions and the world economy: The coming shape of global production, competition and political order*. Oxford: Oxford University Press.

Scott, A. and Storper, M. 1986: Industrial organization and location: division of labour, the firm and spatial process. *Economic Geography* 62, 215-31.

_____ 1988: *New industrial spaces: Flexible production, organization and regional development in North America and Western Europe*. London: Pion.

Scott, J. 2000: *Network analysis: A handbook*, second edition. London: Sage.

Sedaitis, J.B. 1997: Network dynamics of new firm formation: Developing Russian commodity markets. In Grabher, G. and Stark, D., editors, *Restructuring networks in post-socialism: Legacies, linkages, and localities*, Oxford: Oxford University Press, 132-58.

Sheller, M. 2004: Mobile publics: Beyond the network perspective. *Environment and Planning D* 22, 39-52.

Sheller, M. and Urry, J. 2003: Mobile transformations of 'public' and 'private' life. *Theory, Culture and Society* 20(3), 115-133.

Simmel, G. 1890: *Über soziale Differenzierung. Soziologische und psychologische Untersuchungen.* Leipzig: Duncker & Humblot.

_____ 1902: The number of members as determining the sociological form of the group. *American Journal of Sociology* 8(1), 1-46.

_____ 1923: *Soziologie*, third edition. Berlin.

Smith-Doerr, L. and Powell, W.W. 2003: Networks in economic life. In Smelser, N. and Swedberg, R., editors, *The Handbook of economic sociology*. New York: Russell Sage Foundation.

Smith, D.P., Bailey, A.J. 2004: Linking transnational migrants and transnationalism. *Special Issue Population, Space and Place* 10(5).

Smith-Doerr, L. and Powell, W.W. 2003: Networks and economic life. In Smelser, N. and Swedberg, R., editors, *Handbook of economic sociology*. New York: Russell Sage Foundation.

Sölvell, Ö. and Zander, U. 1995: Organization of the dynamic multinational enterprise. *International Studies of Management and Organization* 25, 17-38.

Stark, D. 1996: Recombinant property in East European capitalism. *American Journal of Sociology* 101, 993-1027.

_____ 2000: *For a sociology of worth.* Key Note Lecture at the Annual Conference of the European Association of Evolutionary Political Economy, Berlin, November 3, 2000.

_____ 2001: Ambiguous assets for uncertain environments: Heterarchy in postsocialist firms. In DiMaggio, P., editor, *The twenty-first century firm*, Princeton, NJ: Princeton University Press, 69-104.

Stinchcombe, A. 1990: Weak structural data (Review of Mizruchi and Schwartz). *Contemporary Sociology* 19, 380-82.

Swart, J., Kinnie, N. and J. Purcell 2003: *Managing the careers of IT professional: A competing identities perspective.* Paper presented at the Academy of Management Conference, August 1-6, 2003, Seattle.

Swedberg, R. 1997: New economic sociology: What has been accomplished, what is ahead? *Acta Sociologica* 40, 161-182.

Sydow, J. 2001: Management von Unternehmensnetzwerken – Auf dem Weg zu einer reflexiven Netzwerkentwicklung? In Howaldt, J., Kopp, R. and P. Flocken, editors, *Kooperationsverbände und regionale Modernisierung. Theorie und Praxis der Netzwerkarbeit.* Wiesbaden: Gabler, 80-101.

_____ 2003: Management von Netzwerkorganisationen - Zum Stand der Forschung. In Sydow, J., editor, *Management von Netzwerkorganisationen*, third edition, Wiesbaden: Gabler, 293-354 .

Sydow, J. and Staber, U. 2002: The institutional embeddedness of project networks: the case of content production in German television. In Grabher, G., editor, *Production in projects: Economic geographies of temporary collaboration. Regional Studies Special Issue 36(3)*, 215-227.

Thompson, G.F. 2003: *Between hierarchies and markets. The logic and limits of network forms of organization*. Oxford: Oxford University Press.

Thrift, N. 2000: Rhizome. In Johnston, R., Gregory, D., Pratt, G. and M. Watts, editors, *The Dictionary of human geography*. Oxford: Blackwell, 716-17.

_____ 2004: *Terrorism*. Paper presented at the American Association of Geographers, Philadelphia, 15-19 March 2003.

Tönnies, F. (1887) 1979: *Gemeinschaft und Gesellschaft: Grundbegriffe der reinen Soziologie*. Eighth edition. Darmstadt: Wissenschaftliche Buchgemeinschaft.

Travers, J. and Milgram, S. 1969: An experimental study of the small world phenomenon. *Sociometry* 32, 425-43.

Uzzi, B. 1996: The sources and consequences of embeddedness for the economic performance of organizations: The network effect. *American Sociological Review* 61, 674-698.

_____ 1997: Social structure and competition in interfirm networks: The paradox of embeddedness. *Administrative Science Quarterly* 42, 35-67.

Uzzi, B. and Gillespie, J. J. 2002: Knowledge spillovers in corporate financing networks: embeddedness and the firm's debt performance. *Strategic Management Journal* 23, 595-618.

Uzzi, B. and Spiro, J. 2004: *Small worlds and big differences in success*. Working Paper. Northwestern University, Evanston, IL.

Waldinger, R.D. 1996a: *Still the promised city? African-Americans and new immigrants in postindustrial New York*. Cambridge, MA, Harvard University Press.

_____ 1996b: From Ellis Island to LAX: Immigrant perspectives in the American city. *International Migration Review* 30, 1079-1086.

Wasserman, S. and Faust, K. 1994: *Social network analysis*. Cambridge: Cambridge University Press.

Watts, D. J. 1999a: *Small worlds*. Princeton: Princeton University Press.

_____ 1999b: Networks, dynamics, and the small-world phenomenon. *American Journal of Sociology* 105, 493-527.

_____ 2003: *Six degrees: The science of a connected age*. New York: Norton.

Watts D.J. and Strogatz, S. 1998: Collective dynamics of 'small world' networks. *Nature* 393(6), 440-442.

Wellmann, B. 1983: Network analysis: Some basic principles. In Collins, R., editor, *Sociological theory*, San Francisco: Jossey-Bass, 155-200.

Wenger, E. 1998: *Communities of practice: Learning, meaning, and identity*. Cambridge: Cambridge University Press.

Wenger, E. and Snyder, W.M. 2000: Communities of practice: The organizational frontier. *Harvard Business Review* Jan-Feb, 139-45.

Whatmore, S. 2002: *Hybrid geographies. Natures, cultures and spaces*. London: Sage.

White, H. C. 1992a: Markets, networks and control. In Lindenberg, S. and Schroeder, H., editors, *Interdisciplinary perspectives on organizations*, Oxford: Pergamon, 221-40.

_____ 1992b: *Identity and control: A structural theory of social action*. Princeton: Princeton University Press.

_____ 1995: Social networks can resolve actor paradoxes in economics and in psychology. *Journal of Institutional and Theoretical Economics* 151, 58-74.

_____ 2000: Modeling discourse in and around markets. *Poetics* 27, 117-133.

_____ 2002: *Markets from networks: Socioeconomic models of production*. Princeton, NJ: Princeton University Press.

White, H.C., Boorman, S.A. and R.L. Breiger 1976: Social structure from multiple networks: I. Blockmodels of roles and positions. *American Journal of Sociology* 81, 730-780.

Williamson, O.E. 1975: *Markets and hierarchies*. New York: Free Press.

_____ 1985: *The Economic institutions of capitalism*. New York: Free Press.

_____ 1991: Comparative economic organization. *Administrative Science Quarterly* 36, 269-96.

Wittel, A. 2001: Toward a network sociality. *Theory, Culture and Society* 18(6), 51-76.

Yeung, H. W.-C. 1994: Critical reviews of geographical perspectives on business organisations and the organisation of production: towards a network approach. *Progress in Human Geography* 18(4), 460-90.

Zhou, Y. and Tseng, Y.-F. 2001: Regrounding the 'ungrounded empires': Localization as the geographical catalyst for transnationalism. *Global Networks* 1, 131-154.