

Castells' network concept and its connections to social, economic and political network analyses

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Abstract

This article discusses the conceptualization of network in Manuel Castells' theory of network society and its relation to network analysis. Networks assumed a significant role in Castells' opus magnum, *The Information Age* trilogy, in the latter half of the 1990s. He became possibly the most prominent figure globally in adopting network terminology in social theory, but at the same time he made hardly any empirical or methodological contribution to network analysis. This article sheds light on this issue by analyzing how the network logic embraced by Castells defines the social, economic, and political relations in his theory of network society, and how such aspects of his theory relate to social network analysis. It is shown that Castells' institutional network concept is derived from the increased relevance of networks as the emerging form of social organization, epitomized by the idea of global networks of instrumental exchanges. He did not shed light on the internal dynamics of networks, but was nevertheless able to use network as a powerful metaphor that aptly portrayed his idea of the new social morphology of informational capitalism.

Keywords

Manuel Castells, network, network society, informationalism, *The Information Age*, social theory, political economy, social network analysis

Introduction

Manuel Castells created one of the most ambitious macro theories of our time, which endeavored to interpret the transformation of contemporary society as a reflection of the transition from industrial to informational mode of development. His international reputation grew significantly after the release of his trilogy *The Information Age* in the latter half of the 1990s. It is a political economy-oriented macro-analysis of the tensional relationship between the instrumental networks of informational economy and historically-rooted identities and the world-wide developments conditioned by this. The concept of network entered Castells' thinking in the late 1980s and became a key explanatory category in the abovementioned trilogy (Castells, 1996; 1997a; 1998).

This article discusses the role of the concept of network in Castells' theory of network society. Even if his works have received a lot of attention globally and his books have been frequently reviewed, there are surprisingly few systematic reviews of his conception of network. To underscore this particular matter, this article sheds light on his network concept within a broadly defined network analysis, social network analysis (SNA) as the major reference point. The research question is: How does Castells define and apply the concept of network in his analysis of the network society and how does it relate to genuine social network analysis? The discussion is divided into three themes that accentuate the social, economic, and political aspects of his theory. The first task is to assess how Castells approaches the *social* side of network society in terms of the connection between micro and macro perspectives on networks. At the general level, this discussion aims to identify key intersections of his approach to network and SNA. The second task is to discuss the *economic* side of network society, or more precisely, the question of how the network logic defines social and economic systems and economic geography in particular. Lastly, this article turns its attention to a concept indispensable to understanding Castells' idea of network society, *power*, which creates a thematic connection between his theory and the discussion of the power of global business, the state and interest groups within political network analysis.

Concerning the structure of this article, I first introduce the concept of network and its role in Castells' theorization. After that I position his network concept in the field of network analysis and assess its links to social, economic and political relations in the network society. The discussion ends with a critical view of the nature and legacy of his theory of network society with a special reference to its connection and contribution to network analysis.

The concept of network in Castells' theorization

Manuel Castells was born in the early 1940s in Spain during Franco's military regime. His activism led to exile to Paris, where he continued his studies and eventually started his academic career. In the 1970s he began to consolidate his position as one of the major proponents of Marxist urban sociology (Castells and Ince, 2003; Stalder, 2006). Academically, his main objective came to be to combine Marxist theory with empirically-oriented urban sociology and social movement research in particular (Castells, 1977; 1989).

Castells' reliance on Marxism began to decline in the late 1970s (Rantanen, 2005: 137; Calabrese, 1999). Around that time his academic career took a new turn. Namely, he was invited to take up a professorship in urban sociology at UC Berkeley in 1979. He began to pursue his intellectual passion, research on social movements (Castells and Murphy, 1982; Castells, 1983) and thereafter on the connections between technology, economy, and society (Castells, 1985; 1989; 1996, 1997a; 1998).

In the latter half of the 1980s the concept of network emerged in his analysis. In the following years it came to denote the dominant aspect of a new social morphology in an informatized and globalized world. This view is manifest in the title of the first volume of his trilogy, *The Rise of the Network Society* (Castells, 1996). The concept of network served not only as a recurring theme but essentially as an interpretative framework for practically all his subsequent works (Castells, 2001; 2009; 2011; 2012).

Introduction of networks in The Informational City

In light of the Marxist influence, it is understandable that the concept of network did not figure in Castells' early works. His approach changed in the 1980s, however, as he started to renew his conceptual arsenal. The first significant attempt to clarify network logic within a wider theoretical framework was *The Informational City*. Even if it included only a few direct references to networks, as if it were a mere hypothesis, the concept itself aptly described something fundamental in the emerging social morphology and related changes in the techno-economic system (Anttiroiko, 2015). Castells (1989: 32) writes,

These networks, which could not exist on such a large scale without the medium provided by new information technologies, are the emerging organizational form of our world, and have played a fundamental role in ensuring the restructuring process ... Networks, on the basis of new information technologies, provide the organizational basis for the transformation of socially and spatially based relationships of production into flows of information and power that articulate the new flexible system of production and management.

In the analysis presented in *The Informational City* 'network' had only a modest role in accounting for informational capitalism. It actually created a dual explanatory scheme, for Castells supplemented his Marxist-inspired idea of informational mode of development with an idea of network logic as a novel aspect of social morphology (Fuchs, 2009). The dominance of networks started to resonate in *The Information Age*, as a fundamental explanatory category, pushing informationalism into the background as the enabler of the emerging network logic (Castells, 1996; 1997a; 1998).

Networks as sets of interconnected nodes

In *The Information Age* and many later works Castells defined 'network' rather formally as a set of interconnected nodes:

I shall first define the concept of network, since it plays such a central role in my characterization of society in the information age. A network is a set of interconnected nodes. A node is the point at which a curve intersects itself. What a node is, concretely speaking, depends on the kind of concrete networks of which we speak. (Castells, 1996: 470)

As examples of concrete networks he mentions stock exchange markets and their ancillary centers of advanced financial services in the global financial network; political elites in political networks (e.g. national councils of ministers and EU commissioners in the governance network of the European Union); broadcasting systems, studios, computer-aided communications and social network service

providers in the global network of media, and so forth (Castells, 1996: 470). He explains and elaborates the concept itself briefly in the concluding section of the first volume of the trilogy. He writes:

The topology defined by networks determines that the distance (or intensity and frequency of interaction) between two points (or social positions) is shorter (or more frequent, or more intense) if both points are nodes in a network than if they do not belong to the same network. ... The inclusion/exclusion in networks, and the architecture of relationships between networks enacted by light-speed operating information technologies, configure dominant processes and functions in our societies. (Castells, 1996, 470)

He describes networks by referring to their generic features. At the core of his description is the observation that networks are characterized by binary logic (inclusion/exclusion) and decentralized structures. The existence of networks is determined by the utility of the nodes of the network. If some node ceases to serve the network, it will be phased out or replaced, and the network rearranges itself analogously to cells in biological processes. The importance of each node is determined by its ability to gain credence within the network by sharing information and to program and connect networks by mastering protocols which connect them with other networks (Castells, 1996: 470-471; 2000a; 2000b; 2009; Stalder, 2006: 135-136; Anttiroiko, 2015).

The introduction of a network concept was not motivated by its distinctiveness as such, nor did it indicate any particular methodological contribution in Castells' works. Actually, he presents the idea of the centrality of network logic in the first volume of the trilogy as if it were a result of an inductive reasoning based on empirical evidence (or at least as a verification of his hypothesis on network logic):

So observations and analyses presented in this volume seem to indicate that the new economy is organized around global networks of capital, management, and information, whose access to technological know-how is at the roots of productivity and competitiveness. (Castells, 1996: 471)

However, he presents this at the end of the first volume of his trilogy as a corollary to the idea he had presented much earlier in *The Informational City* (1989). He did not obviously derive the idea from empirical observations, as he did not examine social or economic networks in the first place, but rather framed his observations with the pre-existing institutional notion of network inspired by technology-oriented discussions about networks, initially especially with François Bar (Castells, 1996: 470n), and previously published references, which discussed networks in the context of complexity theory (e.g. Kelly, 1995) and evolutionary and institutional economics (e.g. Freeman, 1991). Castells obviously realized that network was a powerful explanatory category. It served as a kind of historically grounded "epochal axiom" in a social theoretical deduction from general theoretical principles to the explanation of empirical phenomena, such as new business models, work life, social movements, urban conflicts, and state restructuring (Castells, 1996; 1997a; 1998). Let us take a brief look at such conceptualizations, as they serve well to illustrate Castells' approach to networks.

The state, social movements and enterprises as networks

Castells discussed various instances of network logic in his opus magnum and many later works. One of the institutions to which he paid special attention was *the state*, which for obvious reasons had its place in the discussion about the transformation of power relations in the network society (Castells, 1996; 2011). He showed how the role of state, even if not becoming entirely obsolete, was eroded in domestic economic policy, international relations, the military, and the media (Stalder, 2006). He applied the idea of network to the analysis of the state, following the axiom that if networks have become the most important form of social organization, this must also apply to the state.

The network state emanates from the complex networks of power, being manifest in a multi-level and multi-sector decision-making system based on negotiations (Castells, 2000a; 1996). This development changes the essence of the state from being the promoter of accumulation and restructuring to becoming the coordinating node of complex societal processes (Carnoy & Castells, 2001: 14). This is how Castells anchors his discussion of state restructuring on network logic, which eventually became a key concept in governance discourse.

In Castells' conception there are points that make sense in the increasingly diffuse world of public governance. Yet he is obscure regarding what the extra-state sources of power are. Stalder (2006) calls the treatment of the new forms of power in and of networks the single most problematic part of Castells' theory of the network society. He chose the European Union (EU) as the major example of his empirical analysis—most likely because of the apparent network-like features of this newly emerged macro-regional formation—characterizing it as a network state. However, his analysis was subjected to considerable criticism, for it simply contradicted any critical observation of the emergence and realities of the EU, most notably those of struggling with the formation of the community and the pervasively bureaucratic nature of its governance system (Barry, 2001; Holton, 2005: 211; Stalder, 1998). In all, his analyses of the nation-state, the European Union, and global governance seems to be driven by the presupposed network logic of his explanatory scheme rather than empirical observations of the institutional instances of governance.

Similarly, when analyzing new forms of resistance, activism, and political engagement, the network logic appears to be relevant (Castells, 1997a). As a manifestation of his long-lasting interest in social movements (Castells, 1977; 1983), Castells scrutinized the recent *civic movements and protests* that erupted in various parts of the world in one of his later works, *Networks of Outrage and Hope*. He presented the cases from the Arab uprisings to the indignados movement in Spain and the Occupy Wall Street movement in the US as networks supported by the new communication tools (Castells, 2012). However, to explain what he wanted to explain would have required a more precise understanding of the Internet, mobile technology, and social media in everyday life, as pointed out by Barassi (2013) and Fuchs (2012). Castells perceives protest movements essentially as autonomous communication networks irrespective of the actual penetration, use, and significance of information and communication technologies (ICTs) in the given real-life settings. Likewise, if everything from Facebook to protests in the streets of Seattle is explained in terms of a preordained network logic, the ability to accurately account for the emergence, forms, and operations of social movements becomes questionable. In such analyses, the metaphorical use of the concept of network appears to be a social counterpart to technological determinism with diminishing return on its use (Anttiroiko, 2015).

As a third example of his application of network metaphor we may mention *network enterprise* at the very core of the techno-economic paradigm. We live in a new economy characterized by informationalism, globalness, and networkedness. At their intersection we may locate a network enterprise, which refers to such instrumental networks which are composed of enterprises or their constituent units to perform various business and development projects and change into new ones whenever needed. Castells describes how network logic works across organizational boundaries and how through projects an enterprise becomes one with a globally networked business world (Castells, 2000a).

According to Castells, network enterprise is,

[...] that specific form of enterprise whose system of means is constituted by the intersection of segments of autonomous systems of goals. (Castells, 1996: 171)

This definition is certainly abstract but its elaboration reveals a paradigm shift as it implies that the true actants in such a constellation are projects processed within networks, not corporations themselves, accompanied by the claim that survival outside the networks becomes increasingly

difficult. If we generalize this, it means that for the first time in history, the basic unit of economic organization is not an enterprise but a network (Castells, 1996: 160-171). Here again, his ideas are insightful and crystallize something fundamental about the tendencies of the complex reality of disorganized capitalism. Yet, we may ask whether his conception is rooted in the empirical reality of global business, as he provides only a sketchy picture of network enterprise and fragmentary evidence of the role of networked activities in the business world (cf. Kling, 2002).

The overall impression is that Castells' institutional network concept started to live a life of its own without grounding discussion on empirical analysis of social relations (Stalder, 2006: 125-126). In addition, while turning from meso-level descriptions to macro-level theorization, the institutional network conception inevitably evolved into a metaphor. To be more precise, reliance on a consistent but abstract definition of network and an explication of its key dimensions made it possible for him to apply this idea metaphorically to encompass practically any disorganizing and decentralizing tendency characteristic of late modernity. Hence a result of a seemingly all-embracing theory of contemporary society.

Network society in a globalized world

Castells' idea of a network must be understood in the context of his epochal grand narrative built to provide a framework to comprehend the logic and societal tensions of a technologically mediated, globalized world. He described the role of networks in his social theory as follows (Castells, 1996: 469):

... dominant functions and processes in the information age are increasingly organized around networks. Networks constitute the new social morphology of our societies, and the diffusion of networking logic substantially modifies the operation and outcomes in processes of production, experience, power, and culture. While the networking form of social organization has existed in other times and spaces, the new information technology paradigm provides the material basis for its pervasive expansion throughout the entire social structure.

Recalling his Marxist roots, Castells repeatedly emphasized that the network society is a capitalist society. In fact, for the first time almost the entire globe can be said to function under the conditions of the capitalist system (Castells, 2000a). The main tension of such a societal formation is that between capital and labor, as depicted in Karl Marx's thesis of the in-built contradiction of capitalism. According to Castells, a key contradiction critical to understanding informational capitalism is the historical asymmetrization of the capital-labor relationship: while capital becomes stronger by creating networks, labor becomes weaker through individualization (Castells, 1996: 471; 1997b).

At the risk of oversimplification, we may say that informational capitalism works through global networks of instrumental exchanges. Such a new form of capitalism is 'informational' in the sense that it is based on a new technological paradigm characterized by information generation, processing and transmission that have become a fundamental source of productivity and power (Castells, 1989; 1996; Smart, 2000; Fuchs, 2009). Such a mode of development affects social life through the facilitation of the global networks of financial players, transnational service firms, and multinational producers. Their ability to process flows within their networks demonstrates the ultimate power of network logic in the economic system.

Macro-level network logic comes into this picture in Castells' dramatic claim that individuals, groups, communities, and even nations are included in or excluded from the networks of economic power depending on their usefulness to such networks. It is not entirely clear what these networks actually are in their concreteness, but the heuristic power of this insight is immense. It implies that the processes of human life are increasingly conditioned by global economic networks that position people

according to their “use value” and create sophisticated means of controlling the material basis of everyday life. This creates tension, which Castells (1996, 3) articulated in one of the most widely quoted crystallizations of his theory: “Our societies are increasingly structured around a bipolar opposition between the Net and the Self.” He built an emancipatory message into his theory, depicted in the idea of power of identity as a counterforce to the instrumental tendencies of globalized informational capitalism (Castells, 1997a).

Towards micro-sociological concept of network

Castells’ notion of network became more nuanced later in his career. The most recent phase of his academic career has been devoted to the analysis of communication, power, and networks. Most notably, his interest in micro sociology gained ascendancy, as in refining his view with biological analogies, neuroscience, and frame theory (Lakoff, 2008; Damasio, 1994; Kelly, 1994; Entman, 1993). Concerning networks, rather than elaborating his view of them as patterned social relations, he patched up his theory of network society by drilling deeper into micro-sociological explanatory schemes (Castells, 2009; 2010).

Castells sketched an ontological multi-layered scheme, according to which humans as conscious actors resemble organic networks (neuron networks) being influenced by communication networks, which in turn are structured by power and counter-power networks, which form the essence of network society (cf. Delfanti, 2009: 2).

Castells places great faith in the network theory, proposing that it may even offer a unifying language and framework for the natural sciences, humanities, and social sciences (Castells, 2009; 2010), akin to new network conceptions, such as those developed by Capra (2003) and Barabási (2002), and at the same time switching emphasis in the approach to networks from methodology to ontology (Eriksson, 2005). While he stood by the basic tenets of his theory, his micro-sociological views brought new elements into his explanatory scheme. It is noteworthy, however, that rather than delving deeper into the formation, internal dynamics, and inter-relations of networks, he turned to the micro-sociological fundamentals of the theory of network society. This is a methodological project, which Castells touched upon in *Communication Power* and referred to in some of his speeches (e.g. Castells, 2010) but which he did not set himself to complete.

Social structure, economy, and power in the network society

This section sheds light on how Castells’ network concept relates to network analysis. The discussion focuses on his approach to three critical issues that relate to changing social structures, economy, and power in society, i.e. a micro-macro link in network theory that makes it plausible to speak about network society; the essence of networkedness that changes the structures of economy and society; and the power of global instrumental networks and their relationship to the state as expressions of the new configuration of power. These questions afford access to the assessment of the connections between Castells’ theory and different strands of network analysis.

Building a social network theory: from social ties to macrostructures

Castells is probably the best-known advocate of the theory of network society. It is thus fair to assume that his work has a connection to network analysis and contributes to its development. This is the case, in a sense, but at the same time there is almost complete silence between him and network analysts. In his major works, Castells does not refer to the classics of SNA. Similarly, even a brief look at the SNA literature shows that Castells does not figure in the reference lists of key works at all, even if he is a widely discussed and frequently cited social theorist. People are at liberty to decide whom to refer to and whom to ignore, but the above situation is in any case intriguing, as either way the key

explanatory category is ‘network’ and they apply it to social research. A reason for such a mutual indifference is obviously the fundamentally diverging approaches to networks, which is worth a brief elaboration. Another and equally interesting question is whether a closer connection would be mutually beneficial: for Castells in terms of empirical evidence and a better understanding of the internal dynamics of real-life networks, and for SNA in considering the usefulness of the institutional network concept and the relevance and ways of conceptualizing networks in macro-level social theory.

We may begin with the roots of SNA, which include Jacob L. Moreno’s work on sociometry, Alfred Radcliffe-Brown’s anthropological studies on tribal social relations, and the interactionist sociology of Georg Simmel. When social network analysis started to proliferate in the early 1970s, sometimes referred to as the Harvard breakthrough (Scott, 2000), it depicted structural relations as the primary explanatory category and developed sophisticated conceptual apparatus and formal tools to analyze them. Ever since the outset it has been empirically driven and inclined to formal methodology, such as the use of diagrams, matrices, formal modeling and computational method to study social networks, which helped in forming a “scientific” approach to networks and making it possible to build explanatory theories (the history and basic features of SNA are well documented, see e.g. Leinhardt, 1977; Wellman and Berkowitz, 1988; Wasserman and Faust, 1994; Scott, 2000; Freeman, 2004; Knoke and Yang, 2008; Scott and Carrington, 2011; Kadushin, 2012).

In its paradigmatic form, SNA focuses on the interaction of dyadic relationships and small groups, which Castells did not address in his analysis at all. In other words, Castells did not analyze social relations but conceptualized them as imprecise impersonal exchange relations at a theoretically constructed whole-network level, relying on benefit-based antecedents or the utility maximization view of network formation as a reflection of instrumentality built into the logic of the capitalist system (Anttiroiko, 2015). Such a network concept is in essential respects institutional, with far-reaching consequences for the ontology of networks (see Eriksson, 2005).

At the same time we may ask whether such a situation also reveals something essential about SNA as a research tradition, namely about its reluctance or difficulty to move beyond situated patterns of social behavior. This implies that while SNA usually keeps extreme methodological individualism at arm’s length, its methodological transactionalism (McFarland et al., 2011) makes it difficult to conceptualize society. Castells’ institutional network analysis may help in outlining contextual aspects of relationally constructed ‘society’ and thus in reinstituting SNA in social theoretical discourse.

Castells did not explicate the connection between social ties and macrostructures, but rather took a shortcut to the theory of network society through an institutionally oriented meso-level network conception. While so doing, his theoretically constructed network logic surpassed the empirical analysis of the patterns of social relations. Within SNA a long-lasting project bearing some similarities to Castells’ life’s work but applying SNA methodology has been presented by Barry Wellman. He studied a fairly similar and equally wide range of phenomena as did Castells, including communities, organizations, technological development and social structures, and coined or applied various terms equivalent to those used by Castells, such as networked individualism, network city, and network society—most of such conceptions appearing in his works actually earlier than in those of Castells (e.g. Craven and Wellman, 1973; Wellman, 1979). Concerning the societal dimension, Wellman was more inclined to discuss specific network formations (communities, workplaces etc.) rather than society as a whole. He described world as a macrostructure of networks or “networks of networks” and pointed out the relevance of the context of larger network structures for understanding situated social relations. A specific patron-client tie, for example, can be treated as a local manifestation of larger class structures. Such a link can be located at the intersection of internal and external network relations (Wellman, 1988). Wellman did not create the kind of grand theory that Castells did, however. Besides, he was not willing to construct explanatory schemes that go beyond the empirical evidence of factual social relations, which explains the fundamental difference between his and Castells’ approaches. What this

implies in any case is that Castells' agenda can find its equivalent in SNA, even if the approach and methodology are utterly different.

Economic and spatial implications of network logic

Castells' theory of network society is essentially about the impact of informationalism on economy, covering a wide range of issues from the conditions of informational economy, globalization, industrial organization, changes in work and employment, and the emerging space of flows (Castells, 1996). His approach has nothing in common with economic sociology (Granovetter, 1973; 1985; Uzzi, 1997) or economic network analysis (Jackson, 2014), even though the thematic connections are obvious, as exemplified in the economic analysis of interfirm networks, which replaces the standard economic model with a methodological fusion of economics and SNA (Watanabe et al., 2015). However, his factual political economic approach resembles most closely network analysis within evolutionary and institutional economics, in which the proliferation of networks is associated with a view of new forms of organization of information technology-driven and knowledge intensive business, production, and innovation activities, as discussed in the works of Christopher Freeman and Walter W. Powell (see Freeman, 1991; Powell, 1990; Powell et al., 1999). What is noteworthy in this research tradition is its adoption of the institutional network model (e.g. Séror, 1998), which bears a resemblance to Castells' descriptions of specific networks.

According to Castells, the network logic did not only affect economy but also shaped the spatial organization of society. He devotes a lot of effort to showing how the new techno-economic paradigm affects macro-regions, nations, regions, and cities. This explains why his approach has been associated with *economic geography* (Goyal, 2007). One of the most insightful concepts introduced by Castells (1996) was the *space of flows*, which implies that network logic replaces place-centricity, i.e., what counts in an economy is not being in the "right place" but rather being part of the "right network," which forges a link to broadly defined network theory (Ter Wal and Boschma, 2009). In any case the analysis of the spatial implications of network logic presented in Castells' theory differs radically from the geographical analysis adopted in SNA, and may thus provide an impetus to intensify the relationship between SNA and economic geography.

Power of networks

An underlying theme in Castells' political-economic analysis has always been power, which opens up some thematic linkages to political network analysis. He assigns a decisive role in his theory to corporate interests and networks, generalized in his idea of global networks of instrumental exchanges. His analysis reflects the situation after the managerial revolution in the 1980s and 1990s, when attention started to shift from individual enterprises to corporate networks (Scott, 1991).

The analysis of political processes has become an important part of network analysis, even if researchers within this tradition did not always apply structural analytic tools to examine phenomena like relationships between states and interest groups or dependencies at the world-system level (Wellman, 1988: 29-30). A key figure worth mentioning here is John Scott, who conducted international comparative research on economic networks and analyzed corporate interests and capitalist class formation (e.g. Scott et al., 1985; Scott, 1997), accompanied by the works of Knoke (2012), Mizruchi and Schwartz (1992) and many others. Mizruchi (2007) has claimed that a promising direction for political economy-oriented network analysis is power structure research and, within it, the examination of relations between corporations and the state. This is a natural intersection for political economy and network analysis, which points to a link between Castells and network analysts.

Castells emphasizes the critical role of interfirm relations in exploring the underlying logic of network society, in which he shares a research interest with many network analysts (e.g. Mizruchi and Schwartz, 1992). A core configuration at the heart of business networks are interlocking directorates, within which large corporations, and especially financial institutions, connect with one another through multiple memberships on the boards of directors in various corporations. The vast majority of large corporations are tied into a single connected graph, making it possible for them to reach each other through the ties among their board members and create some degree of unity through close interdependence and intricate social ties (Mizruchi, 1982; 1992; Windolf, 2002; Davis et al., 2003). In spite of such a thematic relevance, Castells did not devote himself to accumulating empirical evidence of factual network relations in business but rather explored emerging organizational forms in the economy and shed light on the societal impacts of the power of vaguely described business networks. If we expand our view of business interests to wider societal issues and related policy and governance processes, we come to *policy network analysis*, which focuses on networks in political life and especially networks of state and interest groups. Laumann and Knoke's (1987) classic study on the inter-organizational network of national policy in Washington DC is prime example of such an empirical study. They claimed that a substantial part of government in the United States has come under the influence of narrowly based and largely autonomous elites. These elites do not "rule" the country as they do not act cohesively with each other on a variety of issues (cf. Mizruchi, 1992). Nevertheless, Laumann and Knoke emphasize the policy-shaping role of latent social connections between leaders of various networked organizations with vested interests in the outcomes of domain-specific issues (see also Fisher, 2013; cf. Blom-Hansen, 1997). Knoke (1994) took network analysis to the macro-theoretical level by analyzing relationships of influence (information exchange) and domination (exchange of material sanctions), revealing how well-networked business figures tend to contribute to conveying the interests of the corporate class to the public domain (cf. Marsh and Smith, 2000). Such analyses are thematically linked to Castells' theory and provide partial evidence of his claims of the power of business networks, even though Castells himself did not conduct network analysis to substantiate such claims.

In all, political network analysis contribute to a shift of focus from conventional institutional approach to the state to multi-sectoral policy arenas, which can be seen to refer to an emerging formation of new kind of polity, a network state (Laumann and Knoke, 1987). The latter and similar conceptions create obvious connection with Castells' theorization and actually provide empirical support to his main arguments about the state and a changing mode of governance.

Castells' connection to network analysis

It has become clear that in spite of a range of thematic connections, Castells' work does not have much in common with social network analysis. Even if he distanced himself from Marxism, his intellectual roots and research orientation make it plausible to assume that Marxist-oriented political economy helps to understand his approach to networks. *Marxist political economy* embeds economic activity within political institutions and fundamental issues of class-based social relations. In such a framework it is the structures and institutions of capitalism that condition individual actors (Mizruchi, 2007). Such an explanatory scheme is almost the opposite of SNA. Namely, in Marxist-oriented political economy individuals' positions are deduced from a macro-theoretical scheme manifesting class relations, whereas SNA starts from the empirical and formal analysis of the concrete social relations that constitute emergent social structures (Wellman and Berkowitz, 1988). This explains why Castells did not see SNA as the best way to build the big picture of network society. On the other hand, it goes without saying that he would have benefited from the analysis of the factual forms and influence of global networks of instrumental exchanges and other network formations as it would have allowed better substantiation of his claims.

Even if a genuine social network approach would have yielded a more accurate picture of social relations and their structures, thereby informing theory-building, this does not imply that Castells' analysis is necessarily "wrong" as such. A critical point is that he relied mostly on empirical exemplifications of emerging forms of the social organization of society, which obviously provides only partial evidence of the underlying network logic. On the other hand, SNA would not necessarily have helped in conceptualizing 'network society' as the latter inevitably requires theorization that assumes macro-level structures and determination relations, which cannot be derived aggregatively from the patterned social relations within given empirical network settings. Castells seemed to have realized that network logic is an insightful explanatory category in the production sphere and extended it to other institutional spheres and finally to the determination relations of society as a whole. None of his meso-level analyses were particularly accurate, yet his view of the emerging network logic as a particular mode of social organization enhanced by the use of ICTs nevertheless made possibly the most important contribution to the theorizing of contemporary society. It made it possible to integrate a wide variety of phenomena and different ontological levels into a coherent theoretical scheme (see e.g. Fuller, 2004; Giddens, 1996; Cabot, 2003; Heiskala, 2003).

Castells' theoretical aim was to present an analysis of the transformation of contemporary society as a grand theory, which adopted network logic as its explanatory scheme alongside informationalism. Such a view challenges the traditions of network analysis to reconsider the ways the network concept can be used in macro-level theorization. The question is not only about seeing the world aggregatively as a network of networks (Wellman, 1988) but more specifically, to render a meaningful way of proceeding from factual social relations to the essence of contemporary society and the mechanisms through which it conditions human behavior. Castells used the institutional network concept for this purpose and produced only an exemplifying or illustrative account of real-life networks. Building a macro theory requires insightful 'transgression' as such theory can never be only a simple aggregate of empirical facts. As put by Ellis (1999), according to extreme methodological individualism there is no such thing as society, and taken to the extreme, we may say the same about the state, culture, and social structure. They are social aggregates or generalities to be inferred from individuals behaving in relation to one another. Without going into the details of this ontological dilemma, we may locate its methodological form in SNA, which unbundles networks by investigating the social interaction occurring within them (Pescosolido, 2012). Such an approach works nicely until one faces the challenge of unbundling 'network society.' Even if SNA has been alleged to open up a new horizon to a classic social philosophical dilemma of social order, i.e., how autonomous individuals through their interaction are able to create enduring societies, it has been accused of being at a loss to explain such a macro-structure, which echoes a view that SNA as an approach lacks macro-theoretical resonance (Borgatti et al., 2009; Kadushin, 2012: 11-12). Is Castells' theorization of network society of any help in this respect?

Castells obviously neither built his view of network society from agents and their relations nor conceived of micro-macro link as a macro implication of small-scale interaction (Granovetter, 1973) or interrelated internal and external relations (Wellman, 1988). However, through the results of his macro theory he nevertheless gave an impetus to consider how a network approach could become more substantive and spatio-temporally embedded in its endeavor to construct a relational social theory. Castells gave a hint of the relevance of such a project and even of a multi-layered ontological setting for network theory, but regrettably remained silent on the question that the community of network analysts is compelled to ask: how to make the transition from the analysis of the concrete networks and their relations in the informational economy or other relevant contexts to a higher-level analysis depicting the essential aspects of the macrostructures of society? The network of interpersonal relations as a paradigmatic instance of analysis reflects methodological transactionalism, which may become severely restrictive if it prevents the integration of social relations with non-human aspects of social reality as well as with the macrostructures that condition human behavior. The former extension has been expressed in the actor-network theory (ANT), for example, in its attempt to overcome the agency-structure dichotomy and advance relational materiality (e.g. Crawford, 2005), whereas the latter case has been discussed in this

article in light of Castells' social theory. Comparison between SNA, ANT, and Castells' theory is enlightening in showing how the conceptualization of the network affects the leeway in theory development. Whether such a widening of the perspective gains currency in SNA depends solely on how its usefulness and desirability are viewed among network analysts. We may ask, thus, whether SNA would benefit from a closer connection to macrosociology in its theory building and whether such an endeavor would require a refined analysis of the premises of SNA that go beyond the implicit aggregative view of network society.

Epilogue

Previous discussion shows that the unit of Manuel Castells' analysis of network society is an institution or social system, not an individual or his/her position in any given social network. This explains why he did not dig deeper into social relations within networks. To identify the network-like features in social movements, inter-firm collaboration, and public governance, for example, requires some elementary definition of 'network' but it does not seem to entail that the reference to a network is constructed from its constituent elements, especially when building a macrosociological theory. Castells' solution was to rely on an idea of network logic, which served as a theoretical integrator in his theory building, or should we say "theory assembling."

As insightful as Castells' ideas were at the turn of the 1990s, the axiomatic use of network logic as an explanatory category eventually started to produce diminishing returns. The explanatory scheme that appeared to work well with the macro theoretical analysis in *The Informational City* (1989) and *The Information Age* trilogy (1996-1998) ultimately became disruptive when more detailed analyses of historical instances of social reality were needed (e.g. Castells, 2009; 2012). As aptly pointed out by Harris (2010: 409) in his review of Castells' *The Internet Galaxy*, the book in question offers a distinctive antidote to the teleology and hype on Internet and ICTs but,

... stops short of explaining the consequences of these technologies in purely 'political' terms, relying instead on the network metaphor to unravel the complexities and contradictions of the digital age.

Retrospectively, Castells' theory of network society served as a long awaited structural framework for understanding societies in the globalized world (Collins, 1999; McCarthy et al., 2004; May, 2006; Barney, 2004). Networks had undoubtedly been emphasized in economy and society long before Castells, but none of the earlier works used network as the basic category of the analysis of the capitalist system as he did. He significantly influenced the wider acceptance of the concept of network in social sciences (Heiskala, 2003; May, 2006; Stalder, 1998; on the network society analyses published after Castells' trilogy, see Schiller, 2000; Thompson, 2003; Barney, 2004; Hassan, 2004; McCarthy et al., 2004; Castells and Cardoso, 2005; Lehmann et al., 2007; Cardoso, 2007).

Castells' influential theory tells in its own way that the application of the concept of network does not categorically imply the use of SNA methodology. It can be used as an institutional concept or even as a metaphor without the factual analysis of patterned social interaction within networks. The price to pay is evident: discussion objectifies or even reifies networks (networks are seen as organizational forms rather than as social ties and relations that constitute such networks) and tends to keep the discussion descriptive. Castells paid the price in the form of the criticism he received of his exemplificative discussion of concrete networks (Smith, 2000; Heiskala, 2003; Iyer, 1999; Holton, 2005). He was nevertheless able to anchor his theory in a consistent manner on emerging network-like features of social organization – evidenced by selective empirical exemplifications – which obviously revealed something essential about the social, economic, and political transformations of contemporary society. His consistent synthesis, encyclopedic approach and insightful ideas and neologisms made *The Information Age* trilogy justifiably a landmark in the analysis of the transformation of contemporary society.

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