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'Producing Communities' as a Theoretical Challenge

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Abstract

The aim of this paper is to show that our theoretical understanding of community as a type of social order is rapidly losing touch with empirical studies of various communities; to identify the reasons for this separation; and to propose a new theoretical approach that can solve this problem. It is argued that a crucial problem of community theory is its neglect of the problem of social order due to an insufficient emancipation from Tönnies' classic typology. By using scientific communities as an example, basic aspects of social order in communities are analysed. Scientific communities are identified as producing communities whose social order is primarily maintained by a common subject matter of work. By introducing producing communities as a subtype of communities, the range of community – creating properties and of different kinds of social order is highlighted.

1. The puzzle: Communities which are none

There is an increasing friction between the understanding of communities within both community theory and theory of social order, on the one hand, and empirical findings about community phenomena, on the other hand. Communities are traditionally defined as collectivities of people (a) who share values or beliefs, and (b) whose social relations are relations of affect, characterized by mutuality and emotional bonds, and (c) who frequently interact (Hillery 1955; Bell and Newby 1971: 23-53; Effrat 1974: 2-4; Bender 1978: 7-8; Calhoun 1998: 385). This understanding can be traced back to Tönnies' ([1887] 1991) classical typology of "Community and Society" and is supported by the everyday usage of the word. However, there is an increasing number of empirical observations which do not fit the definition: disharmony (inequality, conflict) in communities (Brint 2001: 6-7), communities without emotional bonds (Lave and Wenger 1991, Hitzler 1998), communities without face-to-face interaction (Cerulo 1997), and large communities of unknown size and without clearly identifiable members (Jindra 1994; Cerulo 1997; Hitzler 1998).[1] Perhaps the most striking example of such a mismatch is scientific communities. The sociology of science can be said to have originated with the attempt to explain social order in science by applying the traditional concept of community. 'Scientific community' originally referred to the worldwide collectivity of scientists, a collectivity that was assumed to be governed by a specific scientific ethos (Merton [1942] 1973). Scientists were assumed to produce new knowledge following the norms of communalism, universalism, disinterestedness and organised scepticism. This idea raised

[1] Brint's recent attempt to adapt the definition by including shared "common activities" and by weakening the conditions regarding affective relationships and interaction frequency does not solve the problem because he still regards communities as "bound together principally by relations of affect, loyalty, common values and/or personal concern (i.e., interest in the personalities and life events of one another)" (Brint 2001:8).

criticism because the empirically observed behaviour of scientists seemed to contradict the posed norms (see Zuckerman 1988: 514-526 for a review of this discussion), and because the community model did not explain the knowledge production in laboratories (Whitley 1972, Knorr-Cetina 1995a). However, the most fundamental challenge of Merton's model (and thus of the traditional notion of community) was the model of scientific change proposed by Thomas Kuhn (1962). According to Kuhn's model, scientific communities are collectivities of scientists whose work is guided by a paradigm rather than by shared values and norms. This model principally contradicted the traditional concept of community in that it was no longer values that hold the community together but knowledge. Some scholars implicitly responded to this contradiction by ascribing normative power to the paradigm, i.e. by conceptualizing it as a set of shared values, beliefs and norms formed from scientific knowledge (Hagstrom 1965; Mulkay 1969; Kuhn 1970). Another, theoretically more radical response was the attempt to conceptualize 'cognitive structures' (i.e., knowledge) as the functional equivalent of shared values and norms (Böhme 1975a, b; Whitley 1974; Weingart 1976: 33-92). The sociology of science's empirically oriented mainstream simply abandoned the theoretical problem and turned to the question how scientific communities emerge (for a review of this research see Chubin 1976). With its microsociological turn at the end of the 1970s, the sociology of science lost interest in scientific communities. Empirically focussing on knowledge production at the micro-level and programmatically rejecting the old Mertonian paradigm, some researchers even denied the existence of scientific communities and explicitly excluded them from their sociological analyses (Knorr-Cetina 1982, Callon et al. 1983, pp. 191-192).

Thus, we are left with a puzzle that is still unsolved: Though scientific communities are commonly believed to be 'true' communities, they are obviously held together and structured by something that is not included by traditional definitions. The aim of this paper is to solve this puzzle by identifying deficiencies of current community theory (2.); by proposing a new theoretical approach (3.); by applying this approach to scientific communities (4.); and by reconstructing community theory in such a way that it allows us to include both traditional and scientific communities (5.).

2. Deficiencies of community theory

The obvious mismatch between the traditional concept and recent empirical findings raises the question of how the traditional concept's exclusivity is being theoretically justified. A closer look at this concept reveals that the definition is phenomenological rather than theoretical, i.e. it lists attributes that empirically observed communities seem to have in common rather than introducing community as a specific type of social order. This approach can be traced back to Tönnies original work on "Community and Society" (Tönnies [1887] 1991). However, the collectivities which were identified as communities by Tönnies have changed as modern capitalist societies developed. The development of community theory has merely reflected the change of its empirical objects. This process began with Weber who regarded Tönnies' proposal as "too specific" and proposed to view community and society as types of social relationships (which may overlap) rather than as a types of collectivities (Weber [1922] 1976: 22).

Since then, the history of community theory has been a stepwise emancipation from Tönnies' historical, normatively laden opposition of two types. Important steps of this emancipation have been:

- the separation of "communities of place" - communities determined by geographical location - from "generic communities" - communities determined by social relationships (Hillery 1955; Bell and Newby 1971);

- the rejection of the "rural-urban continuum" as being a reification of Tönnies' original distinction that is not empirically justifiable (Pahl 1966; Stacy 1969; Newby and Buttel 1980); and
- the introduction of "communities without propinquity" - communities not necessarily built on face-to-face interactions (proposed by Webber 1963, confirmed by Jones 1995; Cerulo 1997; Brint 2001, but rejected by Calhoun 1998).

As a result of this stepwise retreat we have been left at every stage (and are currently being left) with a classic concept that was becoming increasingly suspicious but nevertheless was not being principally questioned. Moreover the concept of community could only be formulated in relation to classics, but not in relation to 'neighbouring' sociological theories or to the general sociological theory of social order. The latter problem has been addressed by Calhoun (1980: 108-109): The traditional theory of community is not able to explain how collective action or coordination of individual actions are achieved in communities.

Because the theoretical discussion has not reflected its own gradual emancipation from Tönnies, the traditional concept of community has also invaded and is currently dominating the theory of social order that discusses community as one basic type of social order. The theory of social order attempts to compare a few basic models of coordination of human action, mainly market, organization, and community (e.g. Streeck and Schmitter 1985; Hollingsworth and Boyer 1997; Wiesenthal 2000). On this level of abstraction a general theoretical concept of community should exist that allows a comparative analysis of types of social order. However, the model of community applied on this level has remained mainly untouched by the gradual emancipation from Tönnies and therefore is a pure phenomenology of Tönnies' classic examples. Community as a type of social order is seen as built on the principle of "spontaneous solidarity" (e.g. Streeck and Schmitter 1985) and by members sharing certain values and norms. Naturally, it is impossible to derive social order in communities from this single principle. Ultimately, there is only a few empirical phenomena left (families, clans, and religious communities), and even for these cases it is doubtful whether their social order can be derived from the principle of spontaneous solidarity.

3. A proposal: Basic features of social order

The difficulties in defining communities as a type of social order reveal a general weakness of the theory of social order: Having not yet developed a consistent theoretical framework of its own, it merely combines phenomenologies of basic models (market, hierarchy, community) in an eclectic way (Wiesenthal 2000). Thus, the problem of how basic features of social order can be described remains unsolved, and no questions are addressed to community theory from a higher level of abstraction.

To overcome this situation, I propose to start from a more abstract level, namely the notion of actor constellation, and to treat types of social order as different types of actor constellations. Actor constellations are collectivities of actors whose interests and action potentials overlap (Mayntz and Scharpf 1995, Scharpf 1997). Thus, the very concept of actor constellation implies an ordering because actor constellations are delineated from their social environments by the fact that only actors with overlapping interests and action potentials belong to the actor constellation. We may now ask how actor constellations emerge and by what means order is produced within these constellations. More specifically, we may ask the following questions:

1. What social phenomena connect the actors, i.e.
   a) what makes actors' interests and action potentials overlap?
   b) what establishes membership of an actor constellations?
2. What social phenomena coordinate individuals' actions and interactions?

While it is possible to apply this approach to other models of social order (markets, organisations, networks, groups) as well, the discussion is restricted to communities. In the following section, the questions will be answered for scientific communities.

4. Social order in scientific communities

Though little systematic knowledge about scientific communities has been accumulated in the last two decades, the empirical findings of scientometric and ethnographic studies of science enable us to reopen the discussion of social order by re-analysing and re-interpreting the data presented in these studies. The following discussion is based on such a reanalysis which focused primarily on scientometric findings.

The first question concerning social order is *what makes a scientific community an actor constellation*. The usual answer to this question is that scientists produce and exchange scientific knowledge about common topics. However, this answer requires further qualification. Are scientific communities the arenas in which new individually produced knowledge is exchanged, or do they produce new knowledge collectively? Depending on how the question is answered, maintaining social order requires either coordinating exchange, rewards and communication or coordinating a joint production by individuals in time and space.

Given the marginality of the idea of collective knowledge production in recent science studies, it is quite surprising how many empirical findings support this idea. Many empirical findings from different branches of science studies can be interpreted as reporting aspects of collective production. Citation context analysis investigates the ways in which scientists in their publications refer to their colleagues' work. Detailed analysis of how the colleagues' findings are used and how usage varies have shown that scientists make the most references to knowledge claims used by them in the research reported by the citing paper. This usage implies a wide range of simply accepting, adding, rejecting and changing knowledge claims (e.g. Chubin and Moitra 1975; Small 1978; Cozzens 1985; Amsterdamska and Leydesdorff 1989). Studies who applied both analyses of citation networks and qualitative methods confirmed that important scientific discoveries changed the usage of older scientific knowledge as expressed in citation patterns (Sullivan et al. 1977; Pickering and Nadel 1987).

Though the sociology of scientific knowledge (SSK) denied the existence of scientific communities, at least some of the empirical data provided by SSK studies can be interpreted as supporting the idea of collective knowledge production, too. However, this interpretation contradicts the intentions of the SSK authors. For example, the observations presented in chapter 4 "The Microprocessing of Facts" of Latour's and Woolgar's book on "Laboratory Life" (Latour and Woolgar 1979: 151-186) can be interpreted as describing collective knowledge production although the authors are clearly in support of the individual production/exchange model (ibid.: 206-208). Knorr-Cetina, who earlier has radically denied the existence of scientific communities (see above), gives a description of high-energy physicists that can be interpreted as supporting the collective production model (Knorr-Cetina 1995b, 1999). Further support can be derived from her application of concepts like "super-organism" (Knorr-Cetina 1995b) or "the erasure of the individual as an epistemic subject" (Knorr-Cetina 1999: 166-171).

The secondary analyses of empirical data presented in both scientometric and SSK studies shows that what is a result from one scientist's microperspective is raw material from the multiple microperspectives of his or her colleagues and, thus, is a component from the macroperspective of the community (Gläser 2001). Furthermore, it becomes clear from these data that a scientist's individual work receives its subject matter, its main means of production and its target from a body of knowledge that is common to a collectivity of scientists.

The second question concerning social order in scientific communities that must be answered is *how membership is established*. After numerous attempts to identify membership, the sociology of science has abandoned the endeavor by accepting that the delineation of scientific communities depends on the sociometric measures applied (Woolgar 1976). In other words: Scientific communities have no inherent boundaries (ibid.: 234).

The problem of membership is closely related to the way scientists contribute to collective knowledge production. Everybody who derives a research problem from a given body of knowledge and works on it (with the prospect of offering a solution) must be regarded as belonging to the scientific community that shares this body of knowledge. Therefore, it is ultimately a scientist's perception as being engaged in a community's collective knowledge production that makes him or her a member. Thus, a scientist's own perception is sufficient to establish membership. That is why sociometric (and, among them, scientometric) measures must inevitably fail. These tools require a measurable activity or state, and it is quite unlikely that all scientists who perceive themselves as members express such an activity or state at the time of measurement. Delineation is even more difficult because even the perception of one's colleagues is sufficient to establish membership. If a knowledge claim is perceived to be relevant and therefore is used, its creator is perceived as a relevant contributor to that collective knowledge production and thus as belonging to the scientific community that makes use of his or her knowledge claim. The fact that membership is perception-based explains why membership is located on a continuum with few very active core members and many less active, less visible and even invisible members.

After having established what connects actors (collective production) and what makes an actor belong to the actor constellation (perception), we may now ask *by what means actions and interactions of community members are coordinated.* Both the above-mentioned scientometric data and laboratory observations suggest that it is not primarily institutions (or norms, or values, or shared goals) that coordinate the actions of scientists who are dispersed in space and time. An alternative answer to this question has been hinted at earlier by Böhme (1975a) and is confirmed by the secondary analyses of empirical findings about how knowledge is used in research and publications (Gläser 2001). It is a scientific community's common body of knowledge, i.e. the subject matter of collective knowledge production, that creates order. Co-ordination is achieved because all scientists belonging to a community share a body of knowledge that suggests certain actions (choice of certain problems, methods and objects) while 'discrediting' others. Thus, co-ordination is essentially a decentralised mutual adjustment of scientists that is mediated by the common subject matter of collective work. This co-ordination is necessarily fuzzy because scientists' perceptions individually vary and because the body of knowledge is continuously changing.

This mode of co-ordination differs from market co-ordination (by prices), network co-ordination (by trust) and the co-ordination of 'classical' communities (by shared values) in that it is achieved by a common subject matter. It differs from organisational co-ordination in that it is no ex-ante division of labour based upon formal rules. Therefore, I have proposed to regard scientific communities as *producing communities* and their collective work as *distributed labour* (Gläser 2001).

To identify the common body of knowledge as a scientific community's central 'co-ordination device' does not mean that there are no institutions that contribute to social order. The institutions which govern (inter)actions in scientific communities are connected to the requirements of collective production. For example, important informal institutions that contribute to social order are methodological and technical rules such as rules of experimentation which guarantee that knowledge claims are comparable and fit together. Other important institutions govern interactions in the collective production of knowledge such as peer

review. However, these institutions do not offer sufficient orientation for scientists' choice of research problems, methods and objects. Thus they cannot solve the basic task of co-ordinating distributed labour.

From this brief account of social order in scientific communities we can conclude that they constitute a specific type of community, namely a producing community that is characterised by the following attributes of social order:

- A specific connection between individuals, i.e. collective knowledge production;
- A membership that is established by individual perception (of being a member) or collective perception (of somebody being a member) and therefore can be of continuously varying strength;
- A specific property that co-ordinates individual actions, namely, the collective work's subject matter, i.e. the common body of knowledge to which individual work is adjusted; and
- Both formal and informal institutions that support collective production by governing both local actions and interactions of community members.

The empirical phenomena characterising producing communities have been observed elsewhere. Recent work on internet communities engaged in the development of open source software revealed social structures that are very similar to those of scientific communities. Empirical findings can be interpreted as describing distributed labour (with a software's current version providing material and target, but not the means for production); coordination by a common subject matter (the software that is collectively produced); and membership by perception (Dempsey et al. 1999, Moon and Sproull 2000). Even the distribution of activity among the community's members seems to be the same as observed for scientific communities.

The type of social order derived from the empirical data on scientific communities and open source software development can be subsumed under the concept 'community' because the actor constellation consist of actors who perceive themselves as having something in common with others – a body of knowledge, respectively a computer program they work on. At the same time, it is impossible to apply the concept community because the 'something' members have in common does not necessarily include a set of values, because there are not necessarily affectionate ties or intensive personal contacts between members, and because the membership status itself is independent of values and personal contacts (and may be indefinitely weak). Thus, the introduction of producing communities challenges traditional community theory because this subtype does not fit the general concept.

5. Refocusing community theory

The challenge posed by the existence of producing communities can be met if we develop a parsimonious definition that enables us to include both producing and traditional (and, maybe, other) communities. I propose to reduce the definition of community as follows: A community is an actor constellation that consists of individuals who perceive to have something in common with others, and whose actions and interactions are at least partially influenced by this perception. Subtypes of communities can be distinguished according to what members do have in common with each other. While these questions have been discussed at more length for scientific communities as an example of producing communities, the following description of other subtypes is drawn from selected literature and has only the heuristic function to highlight the approach (table 1).

	Subtypes of Communities			
	Producing communities	**Communities of Practice**	**Social Movements**	**'Traditional' communities**
Relation to other actors (common property)	Common subject matter of work	Common activity	Common goal	Common norms and values
Membership established by	Perception of having something in common with others			
Coordination of actions by	Common subject matter of work	Partially by institutions	Partially by institutions, ad hoc organisations	Not specifiable
Important institutions	Standards, procedural rules for interactions etc.	Standards for individual conduct of common activity, procedural rules for interactions etc.	Rules defining situations that require action, rules coordinating collective action	Depending on what values and norms are shared
Empirical example	Scientific communities, Open source communities	Communities of Practice (among them professions)	environmental movements, peace movements	Religious communities, fandom communities

Table 1: Basic features of the community as type of social order and some possible subtypes

The main advantage of this comparison is that it clarifies the impossibility of defining one type of social order for all communities. The parsimonious definition of community on this abstract level is that of a constellation of actors who perceive themselves as having something in common with others and therefore belonging to a collectivity. All further specifications of common properties, content of social relations and content of interactions must be avoided on this level of abstraction. Thus, the 'sense of belonging' that constitutes membership is freed from all affective and normative meanings. However, to treat communities as a type of social order it is important to follow Calhoun (1980: 110) in that the sense of belonging must affect members' (inter)actions. Only if individuals interact in a specific way *because* they feel as members of a community, communities may be regarded as creating social order.

Communities of people who share values and beliefs (and whose actions are affected by that) remain within the definition's scope, but do so only as specific types of communities. Depending on what the common property of a community's members is, structure and action in communities vary:

- If the common property is a subject matter of community member's work, it is primarily this subject matter that co-ordinates actions;
- If the common property is a shared activity - e.g. in communities of practice (Lave and Wenger 1991) or in professional communities (Bryk, Camburn and Louis 1999) - this activity implies standards and rules that govern members' individual conduct of that practice but influence their interactions only partially;
- If the common property is a shared goal (as is the case, for example, with social movements), these goals contribute to co-ordination by suggesting certain actions. Nevertheless, organisations are created to initiate, support and thus to co-ordinate collective action (Turner 1970; McAdam, McCarthy and Zald 1988); or
- If the community rests on shared values or beliefs, these values and beliefs imply institutions that govern actions and thus contribute to co-ordination. However, there may be also actions that have nothing to do with the property shared. For example, the admiration for a specific brand has often little to do with the interactions that emerge in these communities (Baym 1995; Muniz and O'Guinn 2001).

This tentative overview demonstrates that the variety of communities and social order can be better explored if the common property is not reduced to values and norms. Though shared values may emerge as a community develops; they do not necessarily play a decisive role and certainly do not always co-ordinate human action. The variety of ways in which actions of community members are co-ordinated results from the variety of common properties whose perception can constitute community membership. The common property that characterises producing communities (a common subject matter of collective work) seems to be a highly specific case. However, taking this variant into account enables a more rationalised approach to communities as a type of social order.

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