

# Chapter XIV

## The Social Order of Open Source Software Production

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### ABSTRACT

*This chapter contributes to the sociological understanding of open source software (OSS) production by identifying the social mechanism that creates social order in OSS communities. OSS communities are identified as production communities whose mode of production employs autonomous decentralized decision making on contributions and autonomous production of contributions while maintaining the necessary order by adjustment to the common subject matter of work. Thus, OSS communities belong to the same type of collective production system as scientific communities. Both consist of members who not only work on a common product, but are also aware of this collective work and adjust their actions accordingly. Membership is based on the self-perception of working with the community's subject matter (software or respectively scientific knowledge). The major differences between the two are due to the different subject matters of work. Production communities are compared to the previously known collective production systems, namely, markets, organizations, and networks. They have a competitive advantage in the production under complete uncertainty, that is, when neither the nature of a problem, nor the way in which it can be solved, nor the skills required for its solution are known in advance.*

### INTRODUCTION

This chapter contributes to the sociological understanding of open source software (OSS) production by identifying the social mechanism that creates social order in OSS communities. The concept of social order is used here in its most basic sense as describing a situation in which actors have adjusted their actions to each other. This order is indeed very high in OSS communities, who produce large and highly complex

software from many independent contributions. It is even astonishingly high when we take into account how few of the most common tools for creating order—rules, commands, and negotiations—are used. Therefore, most analysts agree that OSS is produced in a distinct “new” mode that is qualitatively different from the “corporate way” of software production.

However, none of the four strands of literature on OSS production has produced a consistent explanation of the way in which this amazing order is

achieved. The *participant-observer* literature has proposed metaphors that emphasize the decentralized, democratic, open, and communal nature of OSS, notably the “cooking pot market” (Ghosh, 1998) and the “bazaar” (Raymond, 1999). These metaphors, while suggestive, are not grounded in social theory. *Economics* is still fascinated by the voluntary contributions to a public good, and has consequently focused on motivations to contribute to OSS (Dalle & Jullien, 2003; Lerner & Tirole, 2002; von Hippel & von Krogh, 2003). However, neither these investigations nor the generalized questions about transaction costs (Demil & Lecocq, 2003) or about the allocation of efforts to modules (Dalle, David, Ghosh, & Steinmueller, 2004) capture the specific ways in which an ill-defined group of people manages to produce a complex good. These ways have been looked at primarily in the context of *management and software engineering analyses*, which produced interesting case studies of the coordination of individual OSS projects such as Linux, Apache, Perl, Sendmail, Mozilla, and others (Holck & Jørgensen, 2005; Iannacci, 2003; Jørgensen, 2001; Koch & Schneider, 2002; Lanzara & Morner, 2003; Mockus, Fielding, & Herbsleb, 2002). Some analysts tried to compare OSS communities to “traditional organizations” (Sharma, Sugumeran, & Rajagopalan, 2002) or to catch the specific mode of OSS production with generalized concepts such as “virtual organization” (Gallivan, 2001) or “distributed collective practice” (Gasser & Ripoche, 2003). However, these concepts are similar to the metaphors in the observer-participant literature in that they are ad hoc generalizations that are not embedded in theories of social order or of collective production. Finally, sociological analyses have contributed the idea of a *gift economy* (Bergquist & Ljungberg, 2001; Zeitlyn, 2003), various concepts of community (Edwards, 2001), social movements (Hess, 2005; Holtgrewe & Werle, 2001), the hacker culture (Lin, in this volume), and applications of actor-network theory (Tuomi, 2001). These sociological accounts focus on the specificity of social relations in OSS

communities and more or less entirely disregard the specific mode of production employed by these communities.

Missing from the numerous case studies on OSS production is a description of the social mechanisms that create order by enabling the adjustment of actions. Following Mayntz (2004, p. 241), we define a social mechanism as *a sequence of causally linked events that occur repeatedly in reality if certain conditions are given and link specified initial conditions to a specific outcome* (for a similar definition, see Hedström, 2005, p. 11). Heroically simplifying, we can think of social mechanisms as *subroutines of the social* that are activated under certain conditions and produce specific results. Only by describing the social mechanism at work can we explain how a specific outcome is produced under certain conditions (Hedström). In order to explain how a well-ordered collective production of OSS is achieved under conditions of shifting membership, incomplete information, and autonomous decision making by contributors, we need to find the social mechanisms that create order under these conditions.

Theoretical analyses of this kind are still rare. Only Benkler’s (2002) proposal to regard OSS production as an instance of *commons-based peer production* comes close to describing a social mechanism of OSS production. According to Benkler, commons-based peer production “relies on decentralized information gathering and exchange to reduce the uncertainty of participants,” and “depends on very large aggregations of individuals independently scouring their information environment in search of opportunities to be creative in small or large increments. These individuals then self-identify for tasks and perform them for a variety of motivational reasons” (pp. 375-376).

The focus on information processes contributes an important insight in the process of OSS production. However, Benkler (2002) applies an extremely diffuse notion of production, which makes him subsume every personal communica-

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