Group Decision Making in OSS: A Dialectic Perspective on Herding

Emergent Research Forum paper

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Abstract

Herding behavior in group (collaborative) decision making has been studied purely as imitation of others and discounting own information. However, collaboration is a dynamic process and decision making should be viewed with this dynamic in mind. Drawing on the "The Laws of Imitation" from sociology, we offer a new perspective to understand herding behavior in group decision making. By acknowledging the tension between imitation (respectively counter-imitation) and invention, we conceptualize herd behavior as a dialectic process. This research-in-progress aims at offering a theoretical framework for explaining the dialectic relation between imitation (respectively counter-imitation) and invention. We describe the dialectic process of problem-solving using cases from GitHub. Our research contributes to existing literature by acknowledging that before convergence towards a solution i.e. herding as an outcome, there is a dialectic process. We are offering a research model for dialectic problem-solving within OSS context.

Keywords: Herding, Imitation, Invention, Dialectic, Group decision making.

Introduction

In decision making, group conformity has been shown to be functional in facilitating coordination (De Dreu and West 2001)but also leading to defective decision (Janis 1972). However, evidences have shown that minority dissent stimulates creative thinking or divergent thought. Nevertheless, even if deviant individuals have been shown early to be influential (Asch 1955; Sherif 1936) and conformity has been shown to lead to suboptimal decision-making (Janis 1972), decision-making studies have been dual. They tend to focus solely on herding (Banerjee 1992; Bernheim 1994; Sun 2013)or on leveraging dissent minority for the group (De Dreu and West 2001; Nemeth and Kwan 1987).We are unaware of research offering an integrative perspective of these two streams in group decision making even if we can find trace of this assumption in late eighteen century sociology.

We take the stance to bring in the foreground a long forgotten French sociologist who found more success in the Chicago school of sociology than in his country: Gabriel Tarde (1843-1904). The main focus of his work (De Tarde 1899)has been on the core role played by imitation in our society. He also acknowledges the dynamic interplay between invention and imitation, an aspect that has been neglected in IS literatures. Herding behavior has been studied as purely imitation of other and discounting owns information (Sun 2013) in decision making context. By introducing the tension identified by Tarde in the unfolding of herding, we offer a dynamic and dialectic perspective.

Herding behavior does not unfold in a linear manner nor does dissent emerge as pure and direct confrontation. A better understanding of herding has been shown to be critical on the continuance of system use in post-adoption stage (Sun 2013). Extending our knowledge of herding by studying communication behaviors is also critical in the maintenance of discussion threads as some individuals' positions are challenged during the decision process (Raghu et al. 2001).

The characteristics of Open Source Software (OSS) communities make them a relevant context to study this dialectic as it is a context of virtual, ubiquitous and mostly volunteer collaboration (Daniel et al. 2013) where herding behavior has been observed (Choi et al. 2013). Sharing of ideas and joint-problem solving are marked characteristics of collaborations in OSS projects. The signals generated by OSS projects are seen to induce herding behavior from developers (Choi et al. 2013).

The purpose of this paper is to propose a theoretical framework that explains the dialectic process of imitation and invention, prior to achieving temporary convergence as outcome. We look to advance the understanding of dialectic theory in group decision making within IS domain. The paper is organized as follows. First, we introduce the relevant literature. Next, we present our dialectic conceptualization of group decision making in the OSS context. We conclude with implications for future research.

Theoretical Background

Open Source Software (OSS)

Knowledge sharing occurs in OSS communities despite the absence of existing social relationship. Contribution of many ideas can occur simultaneously rather than sequentially. Integration and recombination are facilitated by the flexibility to use others' ideas easily. Fluidity is a marked signature of OSS knowledge collaboration. Fluidity can be defined through unclear membership and permeable boundaries of the community (Dobusch and Schoeneborn 2015).The fluidity characteristic of OSS means that the shared context is likely to dissipate rapidly over time and as new people contribute. Constant changing foci, flowing and shape-shifting boundaries identify the collaboration and tensions grown within as well as pressures mounts from outside.

The OSS context is an ideal setting to investigate our research question for several reasons. First, social embodiment of ideas adds tension in knowledge collaboration. Social embodiment of ideas refers to decontextualization of the idea (Hughes and Lang 2006) from their authors and the context in which they were originally created and shared. The idea will evolve in unexpected ways as follow-on contributors share their own opinions of the evolved idea(Faraj et al. 2011). Second, the temporary convergence about topics allows ideas to evolve along different tangents, directions, disciplines, foci, interests, and goals. As ideas attract the energy of participants, they are modified, integrated, and recombined until the point of temporary convergence amongst members. Thus, multiple ideas may undergo a process of divergence – convergence in different stages, by different actors, in different ways (Faraj et al. 2011).

Herding

Herding is generally defined as mutual imitation leading to a convergence in action space or behavior patterns clustered across individuals by interaction (Haiss 2010). At the heart of herding is the notion of social learning (i.e. individuals being influenced from observing others' signals) (Haiss 2010). These signals can be either individual actions (for example by observing fellow contributors) or a widely spread 'signal' rule to coordinate (for example commonly adopted practices). The cognitive process of individuals with respect to herd behavior results in true (intentional) herding and spurious (unintentional) herding (Sun, 2013). Spurious herding occurs when individuals arrive at the same decision as a result of commonly shared information. True herding results from an intent to mimic behavior of peers by discounting own information and imitating others (Walter and Moritz Weber 2006). Imitating occurs when a person who is herding observes others and makes the same decisions or choices that the others have made by discounting one's own information (i.e. one abandons his/her own private information and favor a predecessor's action, believing that that person is better informed). The presence of commonly shared information in OSS can result in spurious herding while access to other's decision can result in imitation. Hence, herding is more than unrelated, parallel action, as it requires a coordination driven by social pressure, number of previous adopters; information cascades (Haiss 2010). Due to its inherent nonlinearity, herding may be best modelled by nonlinear dynamic systems (Haiss 2010).

Imitation and Invention

In group-based decision-making process, the study of competing need to stand out and need to conform has been neglected to the benefits of the study of linear herding behaviors (Banerjee 1992; Bernheim 1994; Bikhchandani et al. 1992; Çelen and Kariv 2004; Sun 2013). Interestingly, we can trace the concomitance and tension of those behaviors in early French sociology. Tarde has in *Social Laws* (1899) and then *Laws of Imitation* (De Tarde 1903) studied the interdependent relation between imitation and invention: "[i]nvention and imitation are, as we know, the elementary social acts" (De Tarde 1903, p.144). Novelty is synonymous of invention but also of "generative imitation". However, invention is described as an original combination of new and formerly present elements. He adds further that idea, volition,

judgement and purpose can be imitated or invented. He describes it as a dual relation in which imitation and invention reinforce or limit each another. This tension between these behaviors enables progress and maintenance of social similarities. That's why, progress is also defined as 'collective thinking' through substitution and accumulation leading to a combination of ideas first in the individual mind then in the collective mind. Communications through writing will enable its diffusion. As the idea spreads, the opposition leads to the transformative revision of the idea (invention) through constructive conflict and make its way through the community (i.e. multiple imitations); making steps closer toward convergence.

Reframing Herding into a Dialectic Communicative Process

Authors (Van de Ven and Poole 1995) define dialectic as "colliding events, forces, or contradictory values that compete with each other for domination and control" (p. 517). Following Benson (Benson 1977), social reality is conceived as produced through situated action, as a whole and pervasive full of contradictions. Authors (Carlo et al. 2012) have leveraged a dialectical lens on "dynamic outcomes generated by tensions between underlying contradictory forces." (p.1084). Therefore, we can say that dialectics is concerned with how change and stability unfold from contradictory forces.

Tarde (De Tarde 1903) defines society as "a group of people who display many resemblances produced either by imitation or by counter-imitation" (p. vii). When considering group decision making as a dialectic process, we see that both imitation and invention (also called mutant imitation or generative imitation) behaviors contribute to problem-solving through their constructive conflict. We decompose imitative behavior as imitation or counter-imitation as "a group of people who display many resemblances produced either by imitation or by counter-imitation" (De Tarde 1903, p. vii). Imitation and counter-imitation act as thesis and antithesis and when one overweighs the other, respectively stability or change happens. A main assumption underlying dialectic model is that every thesis has its antithesis that might be voiced or not.

When considering decision making as a dialectic process, we see that both imitation (respectively counter-imitation) and invention behaviors contribute to problem-solving through their contradiction. This opposition is needed to come up with "a joint outcome" (Carlo et al. 2012, p.1084).

Dialectic Herding Theory

Considering the communicative intensity of online context, both behaviors are observable through conversation threads. Our proposed dialectic process of problem-solving is as shown in Figure 1.

Participation in the decision-making process enables the exchange and integration of information as well as increasing individuals' commitment to the choice of the solution. Participation is a critical factor for the community to be able to turn new ideas into a solution (De Dreu & West, 2001). In the type of online collectives considered, communication threads are triggered by the identification of an issue. Then, members will offer some insights to solve the issue. The identification of a problem triggers a novel configuration of knowledge (invention). Invention requires breaking pattern of scheme of thoughts by mobilizing knowledge previously created and leveraged by the community members in a novel way. Building on their previous experiences and shared context, developers express how acceptable the proposed solution is [defined as valence - the degree of social acceptability of a posted solution (Hoffman 1961; Lewin 1935). The invention is evaluated according to individuals' and community's set of principles. If there is congruence, the valence will be positive and will lead to imitative diffusion of the solution (P1a). If there is inconsistency, the valence will be negative leading to counter-imitation (P1b).

Proposition 1 (P1): Through a dialectic process, the social acceptability of the invention is discussed among the members of the community.
    a.   Imitation occurs when invention is consistent with already established principles.
    b.   Counter-imitation occurs when invention is not consistent with established principles.
As community members discuss the invention, if the negative valence of an invention outweighs the positive valence, then, the invention needs to be reconfigured (P2). This process leads to a 'creative joint-production' (Tarde 1899, pp. 9-10). Through the dialectic process, different versions of the initial idea (invention) can be evaluated and the community converges at least temporarily towards a solution.

Proposition 2 (P2): Strong inconsistencies lead to transformative revision of the idea (invention) reinstating the dialectic process.
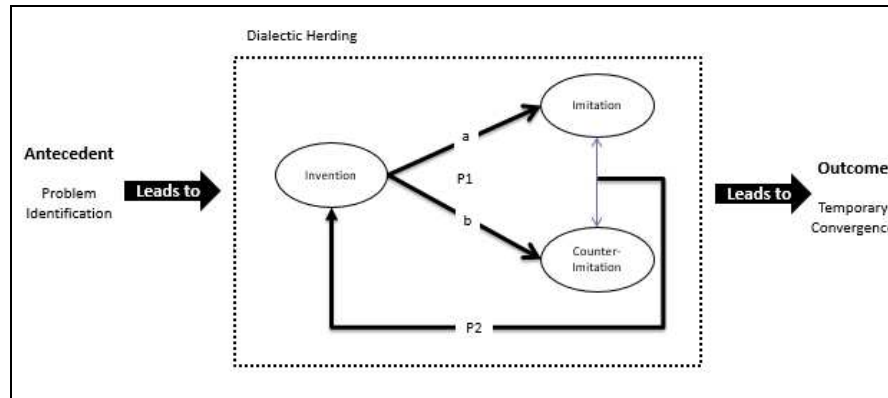

Figure 1: Dialectic Herding Process Model

Research Approach

Reality is assumed to be objectively given and can be described using measurable properties (i.e. through acts of imitation, invention, and counter-imitation during problem solving). Using a deductive approach, the study will look to understand current dialectic herding behavior in OSS context. The case study method is suitable because it seeks to focus on a complex real-life phenomenon that is inseparable from its context (Levina and Ross 2003; Yin 2003). Since existing literature on herding as a dynamic process is very limited, we develop our approach grounded in data through multiple case studies (Eisenhardt 1989). We use a replication strategy to strengthen the generalizability of our findings (Yin 2003).

GitHub a collaborative code-hosting site built on top of the git version control system (Kalliamvakou et al. 2014) and has been successful in attracting developers since its inception. GitHub has multiple categories of OSS projects (e.g. open journalism, data visualization, etc.). Each category acts as project repository containing projects developed using different programming languages (JavaScript, python, c, etc.). A project has multiple contributors. When a problem is encountered, an issue is created by a developer who initiates the process of issue resolution by soliciting member contributions. On volunteer basis, developers join the effort and collaborate towards a solution. Idea sharing is at the heart of the process. Using multiple cases from Github, we will be able to replicate our findings across cases thus improving our confidence in our findings (Eisenhardt 1989; Miles and Huberman 1994; Yin 2003).

Discussion and Conclusion

This paper uses a sociological perspective to explain on group decision making process by conceptualizing it as dialectic. We show how actors manage tensions in the decision-making process through imitation (respectively counter-imitation) and invention in the context of OSS. To do so, we have reformulated the tension identified by Tarde (1899, 1903) to explain progress and stability of our society to explain online group decision making. The contributions are twofold. First, this research develops a research model of group problem-solving within OSS context. Second, we contribute to the herd behavior literature by introducing contrarian behaviors of individuals "sometimes explicitly seeking to avoid joining a herd" (Sun 2013, p. 1036) and so offer a process perspective on how herding may unfold.

OSS communities offer plenty of opportunities to refine the model and specify the dialectic in regard to the accessible public data on their platform. Also, we believe that this work can be extended to any virtual collaboration including participative decision-making because people tend to experience competing needs to conform and to be unique. We also believe this dialectic embodied is reinforced by the frequency a community needs to make decisions and therefore participate in ensuring the stability and success of a community. Further studies may look at individual or subgroups characteristics that lead to joining the herd or engaging in contrarian behavior.

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