Firms, Crowds, and Innovation*

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* The authors would like to thank the Saïd Foundation and Oxford Saïd Business School's research fund for funding the special issue workshop in Oxford and the "Organizing Crowds"-project.

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ABSTRACT

The purpose of this paper is to suggest a (preliminary) taxonomy and research agenda for the topic of "firms, crowds and innovation" and to provide an introduction to the associated special issue. We specifically discuss how various crowd-related phenomena and practices—for example, crowdsourcing, crowdfunding, user innovation, and peer production—relate to theories of the firm, with particular attention on "sociality" in firms and markets. We first briefly review extant theories of the firm, and then discuss three theoretical aspects of sociality related to crowds in the context of strategy, organizations, and innovation: 1) *the functions of sociality* (sociality as extension of rationality, sociality as sensing and signaling, sociality as matching and identity), 2) *the forms of sociality* (independent/aggregate and interacting/emergent forms of sociality), and 3) *the failures of sociality* (misattribution and misapplication). We conclude with an outline of future research directions and introduce the special issue papers and essays.

Key words: strategy, organization theory, innovation, crowdsourcing, open innovation

INTRODUCTION

A host of crowd-related practices and seemingly new, more "open," organizational forms are receiving increased attention in the strategy, organizations and innovation literatures. These include a wide variety of phenomena and practices—such as crowdsourcing, crowdfunding, open innovation, peer and community production, innovation contests, and user innovation—that are being adopted by organizations of all types (Harhoff and Lakhani 2016).

While we are descriptively learning much about these crowd-type phenomena and more open forms of organization, the underlying theoretical and comparative commonalities and differences—as well as their implications for theories of the firm—remain under-specified. These evolving forms of innovation, strategy, and organizing of course are not completely new, indeed there is a long historical record of contests and communities as important drivers of innovative activity prior to and during the Industrial Revolution (Bessen and Nuvolari 2016; Mowery and Rosenberg, 1998). Others have of course long posited that the nature of innovation and production is fundamentally changing (e.g., von Hippel, 1976; 1986). Yet others argue that these new ways of organizing simply represent "hybrid" forms of more discrete organizational types such as markets and hierarchy (Foss, 2003)—or perhaps linked to networks (Powell, 1990) and communities (Adler, 2001). But arguably the organization, innovation and strategy literatures have struggled to theoretically integrate many crowd-related phenomena coherently into their body of work. It also seems that our theories continue to lag practice, where various organizing and organizational "technologies" and designs are outpacing the ability of our theories to capture and explain them (Afuah and Tucci, 2012; Zenger and Hesterly, 1997).

In this paper we fill this gap and focus on various crowd-related phenomena, forms and practices and argue that the theoretical and empirical opportunity is to specify their central features in terms of what we call "sociality" (cf. Zenger et al., 2011), particularly as this sociality relates to strategy, innovation and potentially new theories of the firm. By the word sociality we mean any deliberately designed—or emergent or unintended— social interaction, aggregation or variety of social influence that relates to the firm, its strategy and innovation. We contend that understanding 1) the *functions* of sociality, 2) the *forms* of sociality, 3) and the *failures* of sociality will help us introduce important theoretical and comparative intuition to explain crowd-related practices. Under the rubric of the *functions* of sociality we discuss how this concept can extend rationality and how it plays a functional role in sensing, signaling, and identity matching. Our focus on the *forms* of sociality contrasts the nominal, independent or aggregate, and emergent social interactions—whether unintended or designed—that occur within and across organizations and markets. And in our discussion of *failures* we highlight how the benefits of sociality are often misapplied and misattributed.

Overall we make the case that understanding the functions, forms, and failures of sociality will best help us integrate various crowd-type, peer, and community phenomena into our theories. The opportunity we see is in carefully thinking about how sociality relates to the theory of the firm and its implications for the changing nature of organizational boundaries, and more generally the evolving nature of strategic and innovative activity. We argue that systematically exploring the idea of sociality will generate new theoretical and empirical insights for our understanding of strategy, organizations, and innovation.

We first provide a broad overview of theories of the firm as they relate to innovation, and then focus on the relations between sociality (its function, forms and failures), the firm, and the locus of innovation. We concurrently discuss future research directions and thereafter provide an introduction to the special issue papers and essays.

THEORIES OF THE FIRM AND INNOVATION

Coase's (1937) theory of the firm is seen as a landmark contribution to help us understand organizational boundaries and the comparative dynamics between organizations and markets (Gibbons, 2005; Zenger et al., 2011; cf. Santos and Eisenhardt, 2005). Coase, in short, argued that the existence of transaction costs in markets leads to the "emergence of the firm." He placed emphasis on an "entrepreneur-coordinator," who "directs resources" and more generally "coordinates production." His seminal contribution was to highlight how the visible hand of an entrepreneur or manager (cf. Chandler, 1993; Langlois, 2003; cf. Baldwin and von Hippel, 2011) intervenes in markets, essentially "taking over" the market's invisible hand where coordination occurs through the price mechanism (Hayek, 1945).

While Coase's theory undoubtedly made contributions to our understanding of the nature of firms and markets, what is readily evident is that the approach had a rather thin view of sociality. For example, the judgment about which activities should be handled by firms versus markets was implicitly left to a sole decision maker—the "entrepreneur-coordinator"—who optimizes on the basis of transaction dimensions, such as asset specificity, uncertainty and frequency (Williamson, 1985). Thus the entrepreneur or manager, based on his or her assessment, is the central pivot point and nexus between markets and hierarchy (Zenger et al., 2011). The only form of sociality in this model is represented by factors such as hiring, which is seen as transactional, where employees contract with the manager for their labor—and essentially, their discretion—in exchange for a salary. Activity within the firm, then, is guided by managerial fiat. As aptly summarized by Coase: an employee does not take actions within a firm "because of a change in relative prices, but *because he is ordered to do so*" by the manager (1937: 387).

The problem of course is that the decision calculus of economic activity—for example, about which activities to pursue (make or buy), whom to hire, what strategy to pursue—is necessarily a social activity. This was pointed out early on by Malmgren (1961) who argued that the theory of the firm needed some way of understanding how information aggregates across multiple people within an organization. In other words, the firm is a social entity, rather than just a stylized, singular person—even though the latter conception tends to dominate. Malmgren thus called for theories that recognize the so-called "multi-person" firm. Rather than treating firms as equivalent to the CEO or manager, attention should be given to the underlying social and interactional factors related to decisions and transactions. Some aspects of this sociality were of course central to the Carnegie School (March, 1962). However, the focus on social aggregation and certain forms of sociality and interaction represented an aspect of the Carnegie tradition that sadly did not receive much attention in the decades following Simon and March's early contributions (Gavetti et al., 2011).

The subsequent years of research in the domain of strategy and organization theory have added varied aspects of sociality to our understanding of economic activity. For example, Granovetter (1985) strongly critiqued the Coase-Williamson conception of production and economic activity for not recognizing structural and social embeddedness. The

calculations of transaction cost economics seemed to not recognize the underlying relational mechanisms and forms that underlie and constitute production (e.g., Uzzi, 1996). Important contributions in the innovation literature took their cues from these arguments and highlighted how alliances, network-related and communal arrangements and forms play an important role in firm performance (Dyer and Singh, 1996; Kogut, 2000; Powell et al., 1998).

The technology and innovation literatures have paralleled some of the above developments, by first focusing on internal R&D and various structural features related to firms (e.g., Allen, 1977; Chandler, 1993), and then moving from R&D- and firm-centric conceptions to higher levels of analysis. To illustrate this shift—specifically focusing on the last two decades—it is worth revisiting the topics and concepts featured in the highly visible Administrative Science Quarterly special issue on "Technology, Organizations, and Innovation," published now over a quarter of a century ago (Tushman & Nelson, 1990). This special issue contained landmark articles that introduced and discussed such topics as absorptive capacity (Cohen and Levinthal, 1990), technology and structure (Barley, 1990), R&D and organizational boundaries (Pisano, 1990), technology and organizational ecology (Barnett, 1990), and architectural innovation (Henderson and Clark, 1990). These articles and concepts—many years later—continue to gain attention and to shape the way scholars think about innovation, technological change, strategic management, and organization theory. However, the intervening years have seen significant shifts in the locus, structure, and nature of innovation and associated innovation processes. The combination of product or service modularity (e.g., Baldwin and Clark, 2000) and sharply decreased computing and communication costs have transformed the nature of organizational boundaries and the ways firms innovate (e.g., Felin and Zenger, 2014; Lakhani, Lifshitz, and Tushman, 2013). Fundamental organizational and strategic assumptions at the core of our extant innovation research seem to be called into question with increased modularity and sharply decreased communication costs. For example, the Chandlerian notions of organizational boundaries and associated local communication codes (e.g., Henderson and Clark, 1990), the primacy of local search and satisficing (e.g., Cohen and Levinthal, 1990), the notion that transition costs are lower within the firm than outside the firm (e.g., Pisano, 1990), seem open to reconsideration (see Benkler, 2017; von Hippel and Baldwin, 2011). The firm-specific and R&D-centric model seems to have yielded to a logic of "openness," and different and new ways of thinking about innovation, its locus, and the nature of the firm itself.

The user and open innovation literatures have also questioned our paradigms, specifically in terms of the locus and sources of innovation. Users originate new products, firms and even industries—which would not be captured if we have a singular focus on firm-centric activities and production (von Hippel, 1986; 2005). And, more broadly, there are any number of reasons to be "open" to ideas and knowledge from any number of environmental and outside sources that can productively be harnessed by the firm (cf. West and Lakhani, 2008; West et al., 2014; also see Leiponen and Helfat, 2010): users, customers, suppliers, and universities (e.g., Foss et al., 2011; Laursen and Salter, 2004). Simultaneous developments have also included social movement-like forms of production, as is evident in open source software (Lakhani and von Hippel, 2003). These arguments have raised important questions about the nature of production and the theory of the firm (e.g., Benkler, 2002).

If we step back, it seems clear that there have been a number of changes in how innovation is structured and organized. But while the literatures in these areas are growing

rapidly, the underlying theoretical mechanisms and comparative intuition deserves further attention. For example, studies of crowds and open innovation remain relatively descriptive of the phenomena or attempt to explain micro-behavior by resorting to established theoretical frameworks from within the social science traditions of economics, psychology and sociology, raising questions about the underlying theoretical and comparative and organizational mechanisms. Further, research on crowds and the shifting locus of innovation has often been uncoupled from the firm (Altman, Nagle, and Tushman, 2015). We believe that a central issue that can help the field theoretically understand crowd-related and open practices—and more carefully link them to theories of the firm—has to do with "sociality." We next discuss what we mean by sociality, why we think focusing on it might lead to theoretical insights, and then focus on the functions, forms, and failures of sociality in the context of the theory of the firm, strategy and innovation.

INNOVATION AND SOCIALITY: FUNCTIONS, FORMS AND FAILURES

As described in the introduction, by "sociality" we mean any deliberately designed—or emergent or unintended— social interaction, aggregation or type of social influence that relates to the firm, strategy and innovation. Of course, what sociality is and "does" in the context of organizations and markets has received attention in the literature. For example, organizations are generally seen as being "thick" with varied social processes—related to influence and interaction—as argued by various knowledge-based views of the firm which focus on a range of factors such as social capital (e.g., Nahapiet and Ghoshal, 1998; cf. Kwon and Adler, 2002), socialization (e.g., Spender, 1996) and social identity (e.g., Kogut and Zander, 1992; Tripsas, 2009). These social variables are seen as the central determinants of knowledge creation and innovation. And these social variables are often contrasted with the market's "thin" and atomistic view of sociality (cf. Granovetter, 1985). But as we will argue, these distinctions are far from clear in the context of crowds and the many market-like practices that feature unique forms of sociality and now find themselves entangled with organizing and organizations.

We thus see sociality as an important meso-level concept that can help develop more fine-grained and comparative theories related to innovation and organizations. Our emphasis on the "meso" factors is a deliberate effort to understand the underlying theoretical mechanisms behind the new cognitive, behavioral and social patterns that we are witnessing in the changing landscape of organizations and innovation. Thus our goal, albeit preliminary, is to develop a middle-range theory (cf. Merton, 1949; also see Simmel, 1971) of innovation and organizing, with significant empirical implications for linking the micro and macro as well. Understanding the specific functions, forms and failures of sociality, we argue, provides the key to this theoretical endeavor.

Functions of Sociality

We see sociality serving a number of specific functions in the context of firms and markets—with particular relevance to recent practices such as crowdsourcing, crowdfunding, user innovation and peer production. We discuss three specific functions: a) sociality as extension of rationality, b) sociality as sensing and signal, c) sociality as matching and fostering identity.

First, sociality can serve the function of extending or amplifying rationality. The knowledge, information, ideas and rationality of individuals is necessarily delimited. But sociality can expand these bounds. Thus while the idea of bounded rationality is often applied to firms as a whole—that is, where the firm itself is seen as a unitary, boundedly rational actor (Whetten et al., 2010)—careful consideration should be given to how the aggregation of heterogeneous rationalities within and outside the firm leads to the loosening of these constraints. Individuals within and across organizations have ideas, information, and knowledge that can be harnessed and pooled in powerful ways.

Many of the crowd-type practices represent precisely this type of extension of rationality (e.g., O'Mahony and Lakhani, 2011). We can, then, see organizations—and different types of crowds, as we will discuss later—as essentially a vehicle or mechanism for the extension and amplification of rationality. After all, as discussed by Arrow, organizations [and other social collectives] can "acquire more information than any individual" and thus "collective action can extend the domain of individual rationality" (1974: 16, 53).

This type of social extension or amplification of rationality was presciently also called for by the organizational sociologist Art Stinchcombe (1990) in his book *Information and Organization.* He argues that a central criterion for any theory of organization is that it must somehow account for social rationality: as he puts it, organization theories must "explain how organizations can be more rational than individuals (though of course they are not always)" (Stinchcombe, 1990: 341). The focus on organizations as extenders of rationality, however, is counter to the current pessimism in the literature, where many are obsessed not with rationality but with the pathologies, biases and errors of organizational activity and decision making (cf. Porac and Tschang, 2013; also see Powell, Lovallo and Lovallo, 2011). The problem of course is that focusing on blindness, boundedness and error misses, and cannot explain, the fact that organizations and varied forms of human collective action—including the varied uses of crowds—in fact are responsible for all the built environment and drivers of significant technological progress in the modern world.

A natural extension of the logic of broader collective or organizational rationality is that the inclusion of outside constituents—for example, crowds of varying types—might also serve the functional role of extending and amplifying rationality (e.g., Boudreau and Lakhani, 2013; King and Lakhani 2013). This intuition of course is familiar from other literatures as well. For example, the alliances literature argues that, in dynamic environments, all the relevant knowledge (or, "rationality") can scarcely be housed within firms, and thus the locus of knowledge and innovation increasingly is the network rather than the firm (e.g., Kogut, 2000). Many crowd-related practices serve precisely this function of extending rationality as well, by introducing a wider array of possibilities, knowledge and ideas to the firms in different ways. Outside crowds—of varying types—can be used as an innovation partner (Boudreau and Lakhani, 2013), where problems (or the need for resources or funding: Drover et al., 2017) can be broadcast to those who might have the relevant knowledge and solutions (Jeppesen and Lakhani, 2010). Customers, users and even individuals wildly disconnected from the focal activities of the firm can provide valuable insights, ideas, resources and knowledge that can productively be harnessed and utilized in organizational decision making and innovation (e.g., von Hippel, 1986; Benkler, 2006).

The second function of sociality is the role it can play as sensing and signal. If we think of organizations as entities that process information (cf. Tushman and Nadler, 1978), then different forms of sociality can be seen as ways of sensing and signaling environmental

opportunities. The idea of sensing has recently received significant interest as a central element of organizational capabilities (O'Reilly and Tushman, 2008; Teece, 2007). And sensing is associated with the cognitive architecture of the firm (Powell, Lovallo and Fox, 2011; also see Eggers and Kaplan, 2013). Decision making and sensing are traditionally viewed as the mandate of top management, though there of course are crude informational mechanisms built into bureaucracies and hierarchies as well (cf. Knudsen and Levinthal, 2007). But the onus of this sensing activity is traditionally placed on the manager, in the form of Coasean fiat.

However, recently more democratic and bottom-up forms of sensing show promise as a way of harnessing the collective wisdom that (more often than not) latently sits within and amongst the employees in the firm, and beyond (cf. Benkler, 2015). Felin and Powell (2016) recently studied this type of sensing at the software company Valve Corporation. The company was founded in 1996 by a set of employees who left Microsoft. The Valve founders felt that Microsoft—though of course an innovative company in its own right—did not allow them to undertake new, promising initiatives without intervention from higher-level managers. Valve thus instituted a deliberate effort to involve *everyone* within the organization to sense opportunities. This was done by radically flattening the organizational structure and by allowing any employee to initiate and self-select onto projects that they felt would generate the most value. Thus the responsibility of sensing was radically dispersed amongst the employees, providing a valuable signal about what the company could and should do. These types of practices of course are familiar to us from other settings as well (also see Kleinbaum et al., 2013). For example, Foss (2003) discusses how the Danish hearing aid company Oticon similarly flattened their organizational structure and allowed individuals to self-select onto teams and projects, with powerful outcomes in terms of innovation and performance.

Though we are familiar with flat structures, it is important to note that there are intriguing crowd and process-related innovations—directly related to the social functions of sensing and signaling—that have also emerged and allowed a company like Valve to thrive. Specifically, Valve inadvertently stumbled on a striking innovation, an organizational "technology" of a sort, that helped them optimize how the sensing of opportunities was done within the organization (Felin and Powell, 2016). Specifically, Valve instituted a so-called "rule of three" which specified that if three individuals within the company thought that a strategic initiative or product was worth pursuing—to the point where they were willing to work on this project themselves (and thus perhaps drop other projects)—then this served as a permission and signal to seize the relevant opportunity. The rule of three operated without managerial intervention and put the responsibility of social, joint sensing squarely in the hands of employees themselves. The social process of coming up with ideas, and the efforts to recruit others to work on these ideas, as well as the further shaping of these ideas through social interaction, served functionally as a sensing mechanism and signal about what strategic initiatives might be worthwhile.

As a brief aside: strikingly similar mechanisms can be found in nature as well, in the so called "quorum sensing" literature (Sumpter, 2010). Social animals like ants and bees explicitly use this mechanism to make decisions about where to forage and hunt for food, or where to locate their nest. If a sufficient number of individuals, say, ants or bees, think that a particular location is optimal, then this serves as a collective signal that this is the optimal choice. Thus sociality serves a functional role in the process of sensing and signaling. Similar allusions to insect-like phenomena and coordination have also been made in analyzing the development of open source projects with developers adopting

"stigmergic" coordination where simply the work done by others provides guidance on the next activity to be completed by someone else (e.g., Bolici, Howison and Crowston, 2016).

Of course, this type of dispersed sensing and signaling isn't a panacea and needs to be used with caution, in the appropriate context (Puranam, Alexy, and Reitzig 2014). And it isn't practical for all organizations and industries, as many strategies require the orchestration, cooperation and effort of the organization as a whole. In other words, some organizational settings—depending on what they hope to achieve (Nickerson and Zenger, 2004)—may not be conducive to dispersed experimentation and emergent organization. But even large organizations can institute practices and tools that capitalize on the fact that the organization is a social entity with many individuals whose sensing and signaling capacities—which more often than not remain latent and underutilized—can be harnessed in powerful ways. To provide another example: some organizations have created internal prediction markets and varied voting mechanisms that allow employees themselves to assess opportunities and signal potential sources of value (Cowgill, Wolfers, and Zitzewitz, 2009; Croxson, 2010). Radical decentralization isn't the only option. The infusion of market-type mechanisms like prediction markets provides another alternative to sensing and signaling, where the broad adoption of such approaches—subject to appropriate incentive alignment—can powerfully harness the rest of the organization in making predictions in uncertain environments (Coles, Lakhani and McAfee, 2007; Coles 2011).

In all, the functions of sociality related to both extending rationality and sensing and signaling are fundamentally changing the way organizations, and firms, organize even their most strategic activities. And crowds—both internal and external to the firm—are being utilized as a mechanism for suggesting ideas, adding and aggregating information, filtering, and as tipping points and collective thresholds for organizational and collective decision making. Ogawa and Nishikawa (2016) provide a fascinating overview of how crowds have been systematically used for more than ten years at Muji, the global Japanese-based home goods retailer. Overall the model of the Coasean firm, with its singular decision maker, is rapidly changing, where sociality increasingly plays the functional role of extending rationality and signaling.

Third and finally, sociality serves the function of matching and fostering identity. Many crowd-related practices are social movement-like entities, where ideology and purpose are readily intermingled with work and economic activity. These social movements may feature monetary motivations. But more often than not these may remain peripheral, as intrinsic and prosocial drivers motivate participation and contribution (Benkler, 2017; O'Mahony and Lakhani, 2011). For example, the open source software movement for many is laden with strong ideological aspirations, which are deeply political, social and even revolutionary (Stallman, 2002). Perhaps an unintended and surprising by-product and outcome of the open source software movement has been the massive growth of profitable opportunities and businesses, which have been layered and built on top of the free software movement. For some these hybrid open/closed, free/priced outcomes are fundamentally incoherent and problematic (Stallman, 2009).

However, this incoherence now essentially constitutes the heterogeneous souk of hybrid forms and ways of organizing that somehow touch nearly all aspects of the economy. The debates about the underlying motivations and purposes of these models will undoubtedly continue (for an overview, see von Krogh et al., 2012), with some arguing that extrinsic motivation and incentives continue to play the more significant role (Lerner and Tirole,

2002), and yet others arguing that all of this activity simply represents a type of selfish market logic (Raymond, 2001). But regardless of one's views, the underlying organizational landscape and locus of innovation has certainly been significantly affected (Lakhani and von Hippel, 2003; von Hippel and von Krogh, 2003; von Hippel, 2017).

Arguably one of the strongest effects has come in the form of how individuals think about their identities, and even the very purposes of social organization. Personal identities are closely intermingled with professional ones (O'Mahony, 2003; O'Mahony and Ferraro, 2007; Shah, 2006; von Krogh et al., 2012) and individuals seek to self-select into organizations that match their own identities. In other words, various heterogeneous forms, and the social identities and causes that they espouse, provide individuals an opportunity to match their own identities with those organizations, collectives and purposes that they see as worthwhile. For some purists the open software movement is akin to a broader social movement that questions the very foundations of capitalism (Söderberg, 2015), while, again, for others these movements simply represent an alternative form of markets (cf. Lerner and Tirole, 2001). But these open and closed organizing forms exist simultaneously and allow individuals to select and match their own identities with the espoused identities and purposes of the organization, for example, whether for profit or not. The "Creative Commons" initiative provides an apt example of this, where producers of copyright-able content can choose whether to allow free, staged (semi-free), or strict use of their content, and where those using this content, whether for ideological or practical reasons, can, in turn, select which products to use and which not to use (Lessig, 2002). Varied forms of organization are similarly becoming places that play the functional role of allowing individuals to match their own needs, purposes and interests with those of the organization.

Heterogeneous forms of organization have provided employees a multitude of options for exerting their voice and in participating more directly even in large-scale decision making within organizations. Some of these democratic tendencies are organization and industry-dependent. But the increased options for how strategic activity is organized across organizations allow employees the chance to self-select into those that match their propensities, interests and broader social goals. These changes have led to a host of concepts that try to capture the identity and voice-related dynamics that shape strategy and innovation. For example, some scholars have called for research on so-called "open strategy," where the questions of inclusion, participation and transparency play a central role (Hautz, Seidl and Whittington, 2016; also see Birkinshaw, 2016). Others have contrasted traditional bureaucracy with a "conversational firm" (Turco, 2016), where conversation rather than directives, fiat or hierarchy coordinates economic activity. Identity-related issues loom large in all of these literatures, and provide an opportunity for future theoretical development and empirical work.

Certainly the Coasean model of people doing something "because they are ordered to do so" (1937: 287) feels antiquated given many of the above developments toward openness and varied forms of sharing, social interaction and sociality. Knowledge-based workers expect to join organizations where they can have meaningful input into how they work, what they work on, and even what the organization as a whole aspires toward. This isn't to say that managers will completely disappear (Foss and Klein, 2014), or that hierarchies and bureaucracies will be completely supplanted by flat structures. Though, the identity and voice-related dynamics are an increasing reality for most organizations, as the informational conduits such as social media create avenues for employees to have their say (Turco, 2016).

Of course, the function of sociality as matching and fostering identity isn't just delimited to employees, but also outside stakeholders. Customers and broader stakeholders (e.g., investors) increasingly demand transparency and they exert voice by, for example, not buying a company's products if they don't align with their own identity or if information about ethical or other violations are made public. Furthermore, external pressure groups—boycotts, or collective action orchestrated by social movements—are also increasingly central to strategy itself (King and Walker, 2014). External or outside stakeholders can also play an important role in directing the attention and even structure of firms (Crilly and Sloan, 2013). Overall, organizations fundamentally depend on these external constituents, as they can exert voice and thus materially shape organizational outcomes (King et al, 2010).

Forms of Sociality

So far we have discussed the functions of sociality in the abstract, without getting into the specific forms that sociality can take. Our discussion of the forms of sociality is not meant as a comprehensive catalogue of the varied organizational forms that relate to crowds and innovation. We only point toward many crowd-type phenomena as examples of specific forms of sociality. More fine-grained discussions of what each of these forms is, and how they differ, can be found in our previous work (e.g., e.g. Felin and Zenger, 2014; Lakhani, Lifshitz, and Tushman, 2013), as well as the work of many others (e.g., Nakatsu et al., 2014).

Here we are concerned with the forms of sociality that are either a) independent, aggregate, "thin" and nominal within or across organizations and markets, or b) interacting, "thick" and intensive within and across organizations and markets. Thus the ways in which individuals aggregate and interact—whether deliberate, designed or not—represent broad forms with differential implications for strategy and innovation (cf. Barney and Felin, 2013). Our interests here can be seen as meta-theoretical and related to areas such as organizational design (cf. Gulati, Puranam, and Tushman, 2012), with particular attention on sociality and innovation. While we make a distinction between thin and nominal sociality versus thick, more intensive sociality, our focus is largely on the former as past research has already covered the stronger sense of sociality in the context of organizational forms. And naturally there is overlap between these categories. However, we think making this distinction is useful for theoretically understanding various crowd-related practices in the context of strategy and innovation.

The very simplest form of sociality is one that is only nominal, or put differently, aggregate or "thin." This is where individuals independently—in whatever collective setting—produce, assess and judge outcomes, and the sum total of the individual behavior or efforts somehow gets pooled and aggregated (or averaged) to the collective level (for helpful intuition on this from the levels of analysis literature, see Klein, Dansereau and Hall, 1994). The micro organizational literature has powerfully wrestled with these issues—for example: independent or nominal versus interdependent groups, aggregate versus emergent effects. But the strategy and innovation domain features unique considerations that deserve careful attention (cf. Barney and Felin, 2013), as these have a bearing on new forms of strategy and innovation.

Perhaps the simplest example of nominal sociality and aggregation that is pertinent to the strategy and innovation domain is the idea of the "wisdom of crowds" (Surowiecki, 2005).

The intuition behind the wisdom of crowds—and "crowdsourcing" more generally—of course originated from the work of polymath Francis Galton and his 1907 *Nature* article "Vox Populi." Galton—who also invented the concepts and notions of correlation and regression (Stigler, 1989)—set out to prove the "stupidity and wrongheadedness of men and women," specifically by having individuals (independently, without influence) estimate the weight of an ox that he had placed at the entrance of the Plymouth Country Fair. He received 787 guesses from the public. These estimates of course varied significantly, with many far off the mark. But intriguingly, in the nominal aggregate, the individual estimates yielded an average of 1,198 lbs, which was just one pound off the actual 1,197 lbs weight of the ox. In other words, the nominal and aggregate "crowd" yielded a powerful signal.

A central point of insight from this experiment goes counter to how we generally think of sociality, where the emphasis is placed on thick social interaction rather than independence, where any sociality is only nominal. But social interaction in certain settings—that is: for certain problems and tasks—often leads to pathologies rather than functional signals or rationality (Le Bon, 1895). Thus the power of Galton's experiment is in highlighting how *independent* and *nominal* sociality, while just an aggregate (or in this case, average), can powerfully be utilized to make judgments. The generality of this principle has been shown to hold in other, more micro settings, such as studies of brainstorming. In that context independent and nominal aggregation leads to a far larger and better set of ideas—including much variance—while social interaction leads to a significant reduction in variance and to social pathologies like groupthink, information or idea suppression, and social loafing (e.g., Diehl and Stroebe, 1987). The general principle has significant economic and societal consequences as well. For example, economic bubbles emerge precisely from these types of pathological social interactions where well-meaning knowledge transfer and information sharing create and sustain value-related distortions and pathologies that circumvent the power of independence and the associated collective wisdom that might lie in aggregating or averaging judgments (cf. Shiller, 2002).

Various crowd-related practices in fact are underpinned by the same statistical mechanisms that were identified by Francis Galton, where independent judgment of the value or worth of certain activities or products can lead to powerful insights. A statistical view, as advocated by Galton, is particularly useful for understanding how and why the generation and selection of innovative ideas can be performed in the context of crowds. For example, innovation contests rely on extreme value statistics to find the best performing solution (Boudreau et al., 2011; Lakhani et al., 2013). A contest, at its most basic level, is the instantiation of a statistical distribution of quality for an innovation problem. Each contestant offers a range of possible solutions, creating a distribution from which the best choices, or a useful average, can be drawn. The multiple independent conjectures, draws and contributions provide the distribution, and sponsoring organization might simply pay for the best performing (or extreme value) solution. Emerging evidence points to the fact that the outcomes of innovation contests can outperform the work done by staff in elite research institutions (Jeppesen & Lakhani; 2010, Boudreau et al., 2011; Lakhani et al., 2013).

The selection of innovative ideas that might further be developed into products and firms has also achieved significant uptake in the economy (Mollick and Kuppuswamy, 2016). For example, crowdfunding (equity or otherwise) might be seen as a form of this type of nominal and aggregate sociality, where backing and funding startups is driven, in some measure, by independent assessment, evaluations and behaviors. Individuals essentially "vote with their money," providing a valuable aggregate signal. Many of the settings for

crowdfunding lack market-legitimating actors that could recommend or provide information about these products or startup opportunities, which of course has its own virtues and pathologies. Interestingly, in some contexts these nominal crowds even outperform market experts (Mollick and Nanda, 2016). But overall, crowdfunding represents a bottom up assessment and judgment of dispersed individuals—a form of sociality that is nominal, but nonetheless powerful in its potential to offer a signal—about which products or companies might be funded.

Of course, the crowdfunding area has received significant attention recently and its many manifestations have been catalogued in a number of recent papers and special issues (for a review see Drover et al., 2017; Fleming and Sorensen, 2016). But the theoretical mechanisms that make it interesting deserve more attention. Indeed, one aim of our special issue is to provide preliminary, theoretical foundations for practices such as crowdfunding. For our purposes this phenomenon serves as a helpful illustration of how this practice, and the form of sociality that underpins it, serve various functions, as a way of extending rationality, and where the social dynamics serve as sensing and signal, and further where matching and the fostering of identity create powerful venues for individuals to exert voice and enable collective action and the realization of innovative products and firms.

In terms of sociality and form, crowdfunding raises fundamental questions about the notion of expertise, which is one of the fundamental drivers or assumptions behind bureaucracy and hierarchy, and even the more general social structures of firms, markets and economic activity. For example, funding of economic activity is fundamentally tied to significant sources of capital, as represented by venture capital or private equity. But crowdfunding, for better or worse, democratizes this activity by allowing "lay" individuals, not necessarily experts, to back and support products and initiatives they find worthwhile (cf. Mollick and Anand, 2015). This democratization of innovative activities has also shifted the opportunity set of the wider public to make judgments about the potential viability of a new product or even the viability of a new firm, which historically was the purview of capital markets or venture capitalists. But now the public can participate in the fortunes, peaks and valleys of this activity. These crowd-related phenomena might even dispense with expert judgment, or at least provide an alternative signaling mechanism and mechanism of interaction. While expert judgment of course remains important in many settings (cf. Mollick and Nanda, 2015), even naïve participants in crowd-related activities have been shown, particularly in the aggregate, to beat experts (Dhami et al., 2015; Tetlock and Gardner, 2016). There are in fact questions about just how good venture capitalists, supposed experts in the domain of funding startups, are in assessing the promise and potential of products and startups. Recent, large-scale empirical analysis shows that there is no real, systematic expertise in the domain of venture capital (e.g., Harris et al., 2014), just as there is no meaningful expertise among those who manage large institutional portfolios or private equity (e.g., Lopez-Silanes et al., 2015).

Another intriguing opportunity to utilize sociality and nominal aggregation is in identifying heretofore unidentified talent or expertise within some population or crowd. The wisdom of crowds benefits from the fact that averages provide a powerful informational signal about opportunities. However, in some settings, some individuals—who *ex ante* would not be considered experts—in fact manifest beyond-average skill and abilities. For example, Budescu and Chen (2014) utilized a crowd to make economic forecasts and from these forecasts identified latent experts who, over and over, made prescient estimates that proved useful.

Certain innovation tournaments, competitions and contests similarly serve as vetting mechanisms for the identification of talent and ability. The nominal sociality embedded within contests and their structure enable marginalized individuals (marginalized in terms of, say, technical domain or gender) to be given the chance to participate and succeed under circumstances of blind review (Jeppesen and Lakhani, 2011). Assessments of expertise might be tied to visible, stereotyped characteristics associated with particular individuals (for example, in terms of demographic characteristics or education), though the process of blind submission and contribution can shift the locus of evaluation to what actually matters. Thus nominal sociality in contests also emerges in the form of motivation to compete, compare and potentially win by participants. The presence of others is both the attraction and the motivator for effort exertion (Boudreau et al., 2016). Prediction markets may serve a similar function (Cowgill et al., 2009).

Of course, nominal and aggregate forms of sociality are only thin, that is, social in name only. The literatures on organizational forms have thus focused on "thick" social interaction, where common goals, cooperation, task interdependence and a host of other factors require more careful coordination and collaboration amongst individuals. This literature in fact has recently received a much-needed infusion of insights from a number of key papers (e.g., Fjeldstad et al., 2012; Gulati et al., 2012; O'Reilly and Tushman, 2013; Puranam et al., 2012; Puranam et al., 2014).

It is worth first stating that this "thick" sociality, specifically its origins, cannot simply be assumed, but requires an explanation of how it emerges. For example, where do common goals come from (Simon, 1961)? The importance of this question was recognized by the Carnegie tradition. March, for example, argued decades ago that "the composition of the firm is not given; it is negotiated. The goals of the firm are not given; they are bargained" (1962, p. 672). It is here that we see some interesting opportunities to link the functions of sociality (e.g., sociality as identity matching) with the organizational forms that we observe.

In many cases it is likely that the common values and goals observed within an organization, and the forms that these organizations take (for example, in terms of how they are structured), are essentially latently present in the sets of individuals that choose to join or select into a particular organization or form. That is, individuals seek to find and join causes, goals and purposes that meet their own aspiration and ideas. This might be seen as an overly simplistic way of thinking about common goals, and sociality and form, but it nonetheless provides an important baseline assumption for any social theory (cf. Abell et al., 2014). This intuition was in fact a central component of earlier social theories, though it has not received much attention in the intervening decades. For example, the Columbia School sociologists and social theorists such as Katz and Lazarsfeld argued that "common values precede rather than follow from social interaction" (1955, pp. 59–60). And several decades earlier, Simmel's social theory featured a similar premise, where he began his analysis of form with so-called "component individuals" and argued that "society exists where a number of individuals *enter into* interaction" (1971: 23, *emphasis added*)—thus pointing toward the mechanism of choice and self-selection. We can similarly say that organizations and collectives emerge—including their latent values and goals—where individuals choose to join particular collective or social causes that fit their *ex ante* aspirations, preferences, identities and interests. And these interests might not just relate to the overall purposes and goals of an organization, but also to the actual organizational forms—and the implied structures and relations, or incentives—that are utilized to attain those goals. These dynamics play out in a number of different organizational and social

contexts. For example, social movements are characterized by the process of individuals self-selecting into them (Jasper, 2004), and similar dynamics play out in the career choices of scientists (Roach and Sauermann, 2010; cf. Eesley and Wang, 2017). Overall, an important mechanism behind organizational forms undoubtedly is this process of self-selection, where people "vote with their feet" in terms of common goals and ideals. Indeed, self-selection is a distinguishing factor underlying participation in both contests (Lakhani, 2016) and communities (von Krogh et al., 2003; Lakhani 2016). Individuals choose the institutional structure, i.e. whether to participate in a competition or collaboration; the nature of the project, the amount of effort they will exert and the motivating force for participation. Interestingly psychological factors, such as envy and comparison costs, might also play an important role in the process of individuals self-selecting into different types of organizations and forms (Nickerson and Zenger, 2008).

Having recognized the role of self-selection in explaining common goals, it is important to also recognize that thick socialization, social interactions, relations and other social factors of course also play a central role in the emergence of common purposes, goals and organizations (e.g., Adler, 2001; Kogut and Zander, 1992; Nahapiet and Ghoshal, 1998; Spender, 1996). The literature on communities and peer production has also focused on similar mechanisms (e.g., O'Mahony and Ferraro, 2007). But our focus, in this section, has largely been on sociality and social form that is largely nominal and aggregate. We have done so deliberately, as much of the extant organizational literature has already focused on sociality that is thick, more intensive and strongly interactional (Zenger et al., 2011). Thus we see value in unpacking the forms that sociality takes, and particularly the opportunity to highlight the nominal and aggregate forms of sociality, as these relate to the context of firms, crowds and innovation.

Forms of course can be defined in a number of different ways. Puranam et al. (2014) have recently offered a helpful, generic framework for thinking forms—their "four universals of organizing." They argue that any organizational form needs to consider four problems: task division, task allocation, reward distribution and information flows. Thus they see "organizing as problem-solving," and more generally, organizing as division of labor and integration of effort (Puranam et al., 2014: 164; cf. Lawrence and Lorsch, 1961). We see significant opportunities to link these conversations with our discussion above, to further help us understand how different forms of sociality co-exist and interact in the context of firms and innovation.

For example, among the most central considerations for crowd-related practices and questions of openness and form is the matter of information—its processing, flows and sharing. Various new practices are in effect efforts to try to improve information processing by introducing forms that create interfaces and conduits for others—customers and users, and "crowds" more generally—to meaningfully interact with a focal organization by way of informational inputs, such as product ideas (e.g., Chatterji and Fabrizio, 2014). The information overload that can come from opening the organization to its environment in this fashion, however, requires mechanisms for filtering this information. Somehow the organization needs to transform the mass of possible information to knowledge and eventually some form of wisdom (Ackoff, 1989). Thus the processes and forms which might allow us to generate useful knowledge from information deserve further attention. Given the data and information-intensive environments of the knowledge economy, organizations need to find forms and mechanisms that can allow them to move from masses of data to information and knowledge, and eventual "wisdom"

about which activities and strategies to pursue. The various crowd-type practices, when appropriately designed, might help firms accomplish this task.

Failures of Sociality

Despite our discussion of the functions and forms of sociality, sociality of course can fail in multiple ways. Recognizing these failures, and when and why they occur, is an important next step for the crowds and "open" literatures, with significant implications for strategy and innovation more broadly. We next discuss how the failures of sociality result from its misattribution and misapplication.

The exuberance about various new organizational forms and openness can lead to a rather uncritical stance about the possibilities of sociality, without commensurate attention on the potential costs and pathologies (cf. Boudreau and Lakhani, 2009; 2013; King and Lakhani 2013; Zenger et al., 2011). Interestingly, early research on crowds was in fact precisely about their madness, rather than about their wisdom (Le Bon, 1895). The literatures on crowds and openness have been particularly susceptible to an overly positive view of crowds and openness, perhaps exacerbated by practitioner books that quixotically claim that these practices and forms will revolutionize everything and seemingly guarantee organizational performance. But any form of sociality, while clearly featuring many virtues and benefits, also features attendant pathologies and costs. Thus the general advocacy for particular forms of sociality or particular organizational forms needs to include attention on the costs and problems that might result from misattributions and misapplications.

Part of the misattribution is the result of logical and empirical mis-specifications which come from problematic interpretations about the origins of competitive advantage and organizational performance. To illustrate, we might look at some form of sociality—say, an alliance (or a link with a university) which involves intensive interaction (for example, knowledge sharing) between two social entities—and assume that the sociality within the alliance itself, and the more general relational form, leads to positive outcomes, such as new product development or organizational performance. However, misattributions about what leads to performance can occur if the theoretical and empirical specification do not account for the potential of confounding causes—or put differently, endogeneity (cf. Hamilton and Nickerson, 2003)—related to the ex ante nature of the social entities or firms themselves. For example, the underlying reasons why an alliance was attractive to a firm (or why some form of open relationship between a particular firm and university made sense) could be a confounding factor. Thus the sociality itself becomes co-varying epiphenomenon, rather than a causal driver. Undoubtedly both factors could be at play. However, it is clearly easy to misattribute the performance solely to the sociality itself. Similarly in the domain of open innovation we can sample on firms that are open to varying degrees—on some set of dimensions—and ascribe performance outcomes to this openness, but miss the underlying reasons for why they are open, when, and open to what. Thus, no particular variant of sociality or organizational form is a panacea. Each has benefits and costs, depending on what an organization is trying to accomplish.

A central misattribution is that the various practices and forms related to crowds and openness is that these represent a free resource—readily available to all—without attendant costs (cf. Felin and Zenger, 2016; von Hippel and von Krogh, 2016). But if crowdsourcing is seen as a practice that might yield product ideas and an advantage for a focal firm, naturally this practice will diffuse and thus the costs of inducing crowds and users to interact with competing firms can lead to a costly arms race that in fact dissipates

rather than creates value. Furthermore, the use of any of these practices feature additional, hidden costs related to the organization's attention and its ability to in fact carry out the practices.

Recent scholarship by us (e.g., Felin and Zenger, 2014; Lakhani, Lifshitz, and Tushman, 2013) and many others (e.g., Frederiksen and Rullani, 2015; von Hippel and von Krogh, 2015) has sought to remedy these misattributions by delineating when openness, and of what type, makes sense. This program of research is an attempt to generate comparative and analytic insights about when certain forms of sociality make sense, and when not. The specific focus in this work is on the nature of problems or tasks, and how clearly understanding the problem at hand (its "formulation") can provide guidance for which types of sociality and form might be beneficial. Problems or tasks can be complex and interdependent, or independent and modular. And the information and knowledge needed for solving these problems can be housed within the firm, or the firm may have to access knowledge from outside its boundaries.

Overall, talk about openness broadly, in the abstract, misses the more fine-grained, analytic nuance that is needed to specify when certain forms or governance structures make sense, and when not—and *what* an organization should be open to and *why*. Championing openness and thick forms of sociality has had the effect of throwing a wet blanket over the more careful analysis that needs to be done about the failures that might relate to certain forms of sociality and openness. After all, organizations can be open to wildly different things—ideas, people, knowledge, funds and so forth—and thus coarse references to the benefits misses not only the costs but the more detailed and contingent specifics that help us understand the comparative dynamics between different forms, the problems that they solve and the overall architecture and structure of innovation. Thankfully recent work has moved in these directions (West et al., 2014). Though, in terms of the failures (and benefits) of sociality, it is in this—more fine-grained, analytic and theory-driven—domain that we see significant opportunities for future work on crowds, firms and innovation.

INTRODUCTION TO SPECIAL ISSUE

The special issue papers and essays can broadly be introduced by highlighting how they relate to theories of the firm and crowds, particularly in terms of our overall framework that focuses on the functions, forms, and failures of sociality.

Papers

In the first paper Kolbjornsrud studies how varied agency problems are introduced and solved within different types of collaborative communities. His paper is a deep dive into the specific functions—designed and emergent—of sociality within different types of communities. The organizational literature tends to talk about communities as a monolith. But Kolbjornsrud shows how mutual monitoring, membership restrictions, values and rules and incentives vary significantly across these communities. His research suggests opportunities for future work to more carefully understand and specify the comparative dynamics within, rather than across, organizational forms (in this case, communities), and to further specify the linkages to "pure" forms such as firms and markets.

In the second paper Kornberger focuses on the structural and design-related aspects of various innovation systems. He argues that interface design in innovation systems, and the

design of participatory architectures, as well as the design of evaluative infrastructures, are essential components of innovation systems. Kornberger particularly contrasts visible hand versus more distributed forms of decision making and social interaction, and also highlights the novel linkages between the two. The paper offers a unique view of innovation, touching on both the functional and form-related aspects of sociality.

Manning and Bejarano study how entrepreneurs elicit participation, engagement and behavior through framing. In other words, organizations (or those seeking funding) can influence crowds and potential funders by how they communicate their projects and products to external constituents. Manning and Bejarano specifically look at how entrepreneurs mobilize crowds to fund their projects through different narratives. Their paper highlights how mobilization isn't necessarily tied to the nature of projects or opportunities themselves, per se, but is also influenced by how these are "packaged" to different constituents and crowds. Their paper can be seen as an effort to understand how organizations can functionally "use" crowds to accomplish their desired ends.

Seidel, Langner and Sims focus on how the stage and evolution of technology shapes which crowds are relevant for further technological evolution. In essence, certain types of communities and crowds serve different functional purposes at different stages of the technology lifecycle. Thus crowds and various innovation-relevant communities can be understood as playing an important, unique role, depending on the stage and development of technologies. Seidel et al.'s approach thus offers us a contingent view of the functional use of crowds, which represents precisely the type of nuanced, forward-looking scholarship called for in this special issue.

Finally, Vuculescu studies how humans engage in cognitive search and problem-solving by imposing their models and theories onto the world. She uses both an agent-based approach and experiment to develop her arguments. While the "crowds" in her model are nominal, nonetheless the paper suggests future opportunities to consider how aggregate and social models of environments might influence organizational search and problem-solving. Furthermore, her paper raises important micro-macro questions related to how cognitive models aggregate in social settings such as organizations. Thus her paper can be seen as a stepping stone to study the factors discussed by us above, the functions, forms and failures of sociality.

Essays

This special issue also features three essays on the broad topic of firms, crowds and innovation. These essays are written by prominent scholars from the disciplines of law and sociology, organization theory and strategy. The authors offer broad, forward-looking reflections and ideas on how the nature of innovation and organization is evolving and changing in the context of the various crowd-type practices and phenomena discussed in this special issue.

In the first essay Yochai Benkler focuses on peer production, a particular form of sociality, and argues that it serves a number of functions. He specifically argues for the comparative advantages of peer production, relative to firms and markets, and highlights how they build on pro-social and intrinsic motivations in emphasizing the commons. Benkler argues that various market mechanisms can serve as a hindrance for more radical forms of innovation and growth, which can be fostered and enabled by forms such as peer production and community. This essay is a provocative contribution to this special issue,

and further builds on Benkler's (2002) path-breaking work on the changing nature of production and innovation in society.

In the second essay Nickerson, Wuebker and Zenger can be seen as focusing on all three aspects of sociality: functions, forms and failures. They specifically outline how the use of different forms of crowds represents a governance choice. They argue that different innovation problems can be solved by different crowds, by allowing firms access to the positive aspects of sociality in some cases, and avoiding costs and failures in other cases. Their work links these conversations with the problem-solving perspective (Nickerson and Zenger, 2004), which has recently received significant attention in the innovation and strategy literatures.

Finally, in the third essay Woody Powell raises questions about whether various crowd-related phenomena are new (in terms of function and form), and also aptly points out the failures of sociality that might emerge from these practices and increased openness. Thus Powell considers sociality more broadly and argues that the comparative benefits offered, for example, by secure employment within firms may have led to increased precariousness in terms of careers and the economy more widely. His essay raises the broader consequences of various crowd-related practices, with psychological, economic and sociological implications for individuals and their careers, firms and their performance and responsibility, as well as societal welfare.

CONCLUSION

New organizational practices and forms— for example, crowdsourcing, crowdfunding, user innovation, and peer production—are changing our understanding of the locus and nature of innovation. The purpose of this special issue is to take stock of these changes, and to highlight associated implications for theories of the firm and our broader understanding of innovation and strategy. We have specifically focused on the concept of sociality—its functions, forms and failures—and suggested that attention on these factors will help us make theoretical progress in the organizational and strategy literatures. Furthermore, attention on sociality, as we have discussed, suggests significant empirical opportunities for future work. We link these ideas to the special issue papers essays. As a set, these papers suggest that the innovation and organization literatures are at a critical juncture, and that future research and practice on innovation will necessarily need to be distinct from the past. This period of ferment calls for new theory and fresh observation within the firm and between the firms, markets and communities. Overall our hope is that this special issue stimulates precisely this type of research, which will further help us understand the sociality of innovation and strategy.

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