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Sociomateriality and Organizational Analysis: from Rhetoric to Relevance

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Abstract

This essay expands upon the debate on sociomateriality with a critique of the current ontological agenda. Based upon the influential literature from the fields of management and organization studies, and information systems, it presents the emergence, the development, the consolidation and the popularization of the debate on the relations between the social and the material in organizations. Drawing on this trajectory, the paper suggests that the current agenda for a sociomaterial ontology is constituted predominantly through rhetorical uses of the notion of ontology. The relevance of this contribution lies in questioning the supposed development of a sociomaterial ontology, describing and exemplifying its rhetorical strategies: authorial randomness, theoretical centrifugation, and conceptual procrastination. It concludes that it is necessary to return to the phenomenon as relevant "in" the debate from the point of view of its trajectory: the diffusion of new technologies and the subsequent implications at the organizational and social levels. The main implication for future research is the adoption of pragmatic ontologies with the aim of restoring the primacy of the phenomenon over the ontology.

Keywords: social consequences of the technological change; organizational structure; organizational change; pragmatism; sociomateriality.

Introduction

"Sociomateriality is 'the new black'" is an article title (Jarzabkowski & Pinch, 2013, p. 579) that states considerably about the new fashion in organizational analysis. The fusion of the words "socio" and "material", deliberately without the hyphen, was the label chosen to promote the research position in which one assumes that "the social and the mate- rial are considered to be

inextricably related" (Orlikowski, 2007, p. 1437). After that, the notion of sociomateriality became prominent and has influenced the study of contemporary organizational phenomena, such as social media use in organizations (Treem & Leonardi, 2013), the implications of online evaluations for the organizations being evaluated (Orlikowski & Scott, 2014), the rise and influence of web-based crowd-sourcing and algorithmic rating and ranking mechanisms (Orlikowski & Scott, 2015b), and even a planetary exploration (Mazmanian, Cohn, & Dourish, 2014).

This popularity, however, is already problematic. At the international level, despite some existing empirical studies, the debate is predominantly theoretical, focused on the elaboration of a "sociomaterial ontology", full of controversies. For example, the high level of philosophical abstraction has been pointed out (Leonardi, 2013; Mutch, 2013) as unnecessary for the type of empirical analysis commonly presented, and most articles evoking sociomateriality do it so based upon a few works of Wanda Orlikowski, while the term sociomaterial, with or without the hyphen, exists at least since the 1950s (Jones, 2014). In Brazil, the incipient use of the term already reflects all these problems, which can be verified with a brief search for national dissertations and doctoral theses that suggest sociomateriality as a research perspective.

Thus, this article aims to expand upon the debate about sociomateriality at the organizational level with a critique specifically of the current agenda for the development of a sociomaterial ontology, i.e., capable of ontologically fusing the social and the material. As an essay, the article draws upon influential literature from the fields of Management and Organization Studies, and Information Systems. After this introduction, section two presents (a) the origins of the study of the relationship between the social and the material in organizations between the 1950s and 1980s; (b) the trajectory of four decades of constructivist studies on technology and organizations; (c) the consolidation and theoretical models resulting from that trajectory; and (d) the popularization of the debate on the relations between the social and the material, describing the reasons for the recent academic popularization of the notion of sociomateriality. Drawing on the trajectory presented, the section three highlights the main current criticisms and addresses a new one, i.e., the rhetorical constitution of the sociomaterial ontology, that is, its constitution through rhetorical uses of the notion of ontology, describing and exemplifying strategies through which it occurs. The conclusions indicate the need for a return to the phenomenon relevant in the debate from the point of view of its trajectory, regardless of terms made popular in the recent discussions: the diffusion of new technologies and the implications at the organizational and social levels. The main research implication is the adoption of pragmatic ontologies aiming to restore the primacy of the phenomenon over the ontology.

The study of the relations between the social and material in organizations

Reviewing the emergence, the development, the consolidation and the recent popularization of the study of the relations between the social and the material in organizations can help to better understand this debate, by disclosing a point of view of its trajectory. It is in this point of view that the criticism presented in this article to the recent discussions on a sociomaterial ontology is based upon.

The emergence

It is already known (Leonardi, 2013) – but little discussed – that the merit of first raising the question of the relations between social and material aspects in organizations belongs to scholars of the organizational structure and the social organization of work, by the 1950s and 1980s. At that time, at the peak of the studies of organizational structure and the social organization of work, organizational analysis was marked by two key questions: What social arrangements are best suited to different technical infrastructures to achieve better performance? How does a social system adjust to a technical system?

The first question was raised by the seminal studies of Woodward (1958) and Perrow (1967) about technology and organizational structure. These authors analyzed whether a specific type of technology required a specific type of organizational structure, then understood it as the necessary arrangements between people for getting the work done. Both studies would lead to one of the foundational premises of the contingency theory, i.e., there is no better organizational structure for all organizations, but one that is more appropriate depending on the type of external environment. While analyzing the structure of organizations operating in different industries, those authors concluded that performance depended on the adjustments between the organizational structure and the type of technology being used in the production processes and, therefore, the use of different technologies in the production system required different organizational structures. Hence, in order to optimize production processes, it would be necessary to design different ways of specializing and integrating the work, depending on the type of technology being used. This conclusion inaugurated a view nowadays qualified as deterministic, according to which technology and organization are conceived of as independent entities, related by the impact of the former on the latter (Leonardi, 2013). Such a view has been indicated (Leonardi, 2013; Scott, 1990) as the most lasting legacy left by those precursor studies for organizational analysis.

Despite the fact that such a view still strongly influences organizational analysis, it was challenged, since early, in studies about the social organization of work. At the time, influential scholars such as Mann & Hoffman (1960) and Walker & Guest (1952) investigated the adjustments of social systems to technical systems. The central premise, of the so-called sociotechnical perspective, was that social and technical systems influenced each other, therefore, the relations between them were of mutual dependence, rather than a one-way impact. This premise inaugurated a view nowadays qualified as interactionist, according to which technology and organization are conceived of as interdependent entities, related by interactions that produce organizational change (Leonardi, 2013).

Although it challenged the deterministic view, the interactionist view did not represent a rupture with deterministic assumptions, since sociotechnical analyses focused on how social systems adjusted to technical systems (Leonardi, 2013). Therefore, the interactionist view resulted in a view of technology as a causal agent of organizational change and, as a result, sociotechnical studies often neglected how social systems shaped different uses of a same technology, even in similar organizations (Leonardi & Barley, 2010).

This neglect began to be addressed in a systematic way from Barley's seminal discussion (1988a) on technology, power and the social organization of work. At the beginning of the debate on the transition from an industrial to a post-industrial society (Bell, 1973), Barley (1988a)

analytically contrasted the sociology of automation and the deskilling theory, the most common approaches in discussions about technical change at the workplace at the time.

Sociology of automation assumed that technical attributes of automation technology produced social implications for work, initially negative, but positive later on. Barley (1988a) criticized this approach for an optimistic view of a technically determined future, in which evolution and technical sophistication would reduce alienation and eliminate former problems caused by automation – at the time discussed by authors such as Braverman (1974) and Burawoy (1979). Barley (1988a) also pointed out the predominant flaws of empirical studies in which that approach was employed: focus on abstract typologies; synchronous interpretation of diachronic data; generalizations made from studies conducted at a single industry.

Deskilling theory, on the other hand, assumed that technology was essentially a social phenomenon. It assumed that technical attributes were intentionally designed for deskilling workers in order to reduce labor costs. From this perspective, the primary cause of change was the intention of technology designers, not the technical attributes. Researchers assumed that designers were controlled by large corporations, which would use technology as a mean for materializing the deskilling of workers. Barley (1988a) criticized this approach for its limited view of (a) the context in which technology was implemented, which was often ignored by researchers, and (b) for the supposed relations between management and technology design, which researchers assumed to be of a direct influence of managers on designers. Barley also pointed out the predominant flaws of empirical studies in which this approach was employed: generalizations made from the analysis of a small number of occupations; focus on declining occupations and disregard of the emergence of others; scarcity or absence of empirical evidence to support the argument of a managerial intention to deskill workers, an argument that was predominantly drawn from the discourse of sellers, and not of buyers, of machines; scarcity or absence of empirical evidence to support the argument of an increased managerial control over the work as a result of automation; disregard of the effects of technical attributes.

While proposing these criticisms, Barley (1988a) explored aspects that should be taken into account by researchers willing to understand how the social and the material relate in organizations, systematizing them as follows: interpretive materialism; qualification and power dynamics; technical attributes; organizational and occupational *milieu*; socioeconomic environment. The first encompasses the sources of interpretation of the context in which the technology is used, and which shape how people attribute meanings to machines and techniques. The second encompasses the by which an occupation gains or loses relevance in society due to changes in power dynamics, caused by the emergence of new types of knowledge. The technical attributes are the contextual parameters that condition social action and, therefore, affect the tendency of technology to empower or degrade its users. The organizational and occupational *milieu* encompasses the influences from the organizational structure, the management processes through which technology is introduced into the organization, ideological control, union entities, and the degree of professionalization. And, finally, the socioeconomic environment encompasses the influences from the product marketing, the labor market, and relations between industries.

While discussing these directions he proposed for future research, Barley (1988a) advanced the overcoming of the dichotomies and limitations of studies influenced by the sociology of automation and the deskilling theory. His directions became the basis for further attempts to

understand the relations between the social and the material in organizations. From this point of view, the author was one of the pioneers, since back in the 1980s he called researchers' attention to the following: "if researchers are to persist in the hope of auguring how technology will restructure work, then they will need to systematically decode not only actions and interpretations but also the importance of relevant technical attributes" (Barley, 1988a, p. 73).

In short, the precursors of the study of sociomateriality in organizations were the scholars of the organizational structure and of the negative social consequences of the diffusion of new technologies, between the 1950s and 1980s. It was in that context that the first attempts to understand organizational phenomena as mixtures of social and material aspects emerged, even though the term "sociomateriality" was not common. From then on, a long trajectory of research that in different ways emphasized the relations between interpretation and technical attribute has developed.

The development

According to Leonardi & Barley (2010)'s contextualization, authors such as Barley (1986), Fulk, Steinfield, Schmitz, & Power (1987), Rice (1987) and Zuboff (1988) have the merit – commonly not recognized by contemporary authors – of first arguing, based on empirical evidence, that the effects of technology in organizations are not technically determined, but socially constructed. This argument was fundamental for the development of a non-deterministic view of technology.

The research developed under the initial influence of those authors often argued that it would not be possible to explain how technologies affect organizations without taking into consideration the complexities of the social context and, for this reason, they were classified (Leonardi & Barley, 2010) as constructivists[1]. In general, constructivist studies often presented the following characteristics: they treated technology as a concrete object instead of a production process; they rejected hard forms of technological determinism, even when they acknowledged that a technology's material properties could affect work practices; they argued that social dynamics shaped the adoption, implementation, use, and meaning of a technology, and claimed that previous theories had overlooked this fact; finally, they believed that identical technologies could trigger different dynamics and results, even in similar organizational contexts (Leonardi & Barley, 2010).

The broad *corpus* constituted by such studies portrays the relations between technology and organization as interdependent entities. That is, constructivist studies explain how the effects of technologies on organizations are socially constructed throughout implementation; and they argue that organizational change emerges in a continuous flow of social action in which people react to the possibilities and constraints generated by technologies in the same way as they react to each other. Leonardi and Barley (2010) also classified constructivist studies considering the differences regarding the analyzed phase, the socially constructed phenomenon, and the process by which the construction occurred. They indicated five different constructivist perspectives, summarized in Table 1.

Table 1

Summary of constructivist studies on technology and organizations

	Perception	**Interpretation**	**Appropriation**	**Enactment[2]**	**Alignment**
Phase	Adoption	Use	Use	Use	Adaptation
The social phenomenon constructed	Attitudes, beliefs, and values	Interpretive schemas and frames	Patterns of deviation and conformity	Work practices	Roles and relationships
Construction process	Social influence	Transference	Intra-group interaction	Situated improvisations	Inter-group interaction

Sources: Adapted from Leonardi e Barley (2010).

Studies adopting the perception perspective focused on the social influence of attitudes, beliefs, and values throughout the process of adopting a technology. For example, Fulk et al. (1987) investigated how individual perceptions about the possibilities and constraints generated by a new technology were formed from the attitudes, statements, and behaviors of co-workers. Studies adopting the interpretation perspective focused on the transfer of interpretive schemes and frames during the use of a technology. For example, Barley (1988b) investigated how users interpreted the possibilities and constraints of a new technology drawing on their experiences of using previous technologies, even though the new technology was a different one. Studies adopting the appropriation perspective focused on patterns of deviation and conformity in intra-group interaction during the use of the technology. For example, Watson, DeSanctis, & Poole (1988) investigated how decision-making support systems led to a greater or lesser degree of interaction and collaboration and therefore to decision-making with a greater or lesser degree of consensus. Studies adopting the enactment perspective focused on improvised work practices during the use of the technology. For example, Yates & Orlikowski (1992) analyzed how different forms of electronic communication were constituted from the use of different technologies. Studies adopting the alignment perspective focused on roles and relations during adaptation. For example, Barley (1986) mapped out how the organizational structure became re-aligned throughout changes in roles and relationships resulting from the new types of interactions occasioned by the possibilities and limitations brought about by a new technology.

Until recently, researchers still developed constructivist studies, from the perspective of perception (Yuan et al., 2005), interpretation (Hsiao, Wu, & Hou, 2008), appropriation (Maznevski & Chudoba, 2000), enactment (Volkoff, Strong, & Elmes, 2007), and alignment (Leonardi, 2007). However, it has been recognized that "students of technology and organizing no longer need to spend intellectual capital and energy on debunking technological determinism: social constructivists have shown convincingly that technological determinism does not hold water." (Leonardi & Barley, 2010, p. 41). In other words, it has been recognized that constructivist studies have already accumulated sufficient empirical evidence to refute the deterministic view of technology and organization as independent entities related by the impact of the former on the latter. Such studies convincingly challenged the logic of impact, moderation, technical imperative, and variance inherited from classical studies such as those of Woodward (1958) and Perrow (1967).

In brief, a trajectory of nearly four decades of constructive studies on technology and organizations refutes a view of deterministic relations between the social and the material. These studies allow to conceptually argue that organizational phenomena are produced in interdependence between social and material aspects. This way, they played a fundamental role in the study of the relations between the social and material, even though they did not use the term "sociomateriality".

The consolidation

According to Leonardi (2013)'s contextualization, Stephen Barley has the merit – commonly not recognized in the recent literature – of elaborating the first conceptually systematic critique of the technical determinism, which even influenced a myriad of later research.

The technology-triggered structural change model

According to Leonardi (2013), although socio-technical studies were abundant in the 1970s, they did not produce a conceptual critique of the deterministic view of technology and organizational structure prevailing at the time. The author situates the emergence of a conceptual critique in Barley (1986)' study: "*Technology as an occasion for structuring"*.

Barley (1986) employed the structuration theory (Giddens, 1979; 1984) to conceptually argue that technology was not a determinant of organizational structure, as advocated by studies related to contingency theory. Barley's (1986) argument was that the process of implementing a technology in an organization was an occasion on which organizational actors reevaluated or reimagined the social structures in which they worked.

> Barley's use of structuration theory treated technology as a pivot point between action (communication) and structure (centralization of decision making). … as actors used the new technology and oriented themselves to it, they changed their communication, which, over time, altered decision rights. (Leonardi, 2013, p. 62)

Barley (1986) studied the adoption of computed tomography in two hospitals to analyze how the decision-making process was structured during the technological change process. He treated technology as a social object, not just as a material tool, and the organizational structure (delimited to decision making) as a process rather than an entity. In his study, computed tomography scanners caused similar structuring processes in two radiology departments and, even so, led to the structuring of different organizational forms (delimited to decision making). After the implementation and recurrent use of computed tomography, both hospitals became more decentralized, but in different ways and at different levels. Thus, Barley (1986) suggested that, to understand how the organizational structure changed after the arrival of new technology, researchers would need to integrate the study of action and social structure.

In brief, he concluded that "by treating technology as an occasion for structuring, researchers will confront contradictory results head-on because of structuring's central paradox: identical technologies can occasion similar dynamics and yet lead to different structural outcomes." (Barley, 1986, p. 105). This argument, conceptually supported by structuration theory and empirically demonstrated in the study of adoption of computed tomography, was the starting point to conceptually refute the view of technology and organization as independent entities related by a technical determinism of the former on the latter. Thus, when systematizing a technology-triggered structural change model, Barley influenced researchers to further develop other types of studies, which resulted in the emergence of a new theoretical model a few years later.

The adaptive structuration theory

A few years after the publication of Barley (1986)'s study, another theoretical model was developed, by Gerardine DeSanctis and Marshall Poole (Desanctis & Poole, 1994; Poole & DeSanctis, 1990; 1992). These authors also employed structuration theory to study the relations between social and material aspects in reiterated uses of technology. Their studies resulted in the development of the Adaptive Structuring Theory (AST). The main difference between AST and Barley (1986)'s model was that, instead of using the abstract notion of social structure to refer to organizational decision making (as Barley did), DeSanctis and Poole used it to refer to norms of behavior of small decision-making groups. "Poole and DeSanctis appropriated structuration theory to explain the relationship between technology and social interaction [...] [but] they considered social structure, in the abstract, to be the norms of behavior governing small, decision-making groups" (Leonardi, 2013, p 63). Thus, AST explained especially questions such as: "Why is it that technology impacts are often more subtle than dramatic? Positive in some organizations, yet neutral or even negative in others?" (Desanctis & Poole, 1994, p. 141-142). The answer suggested by the authors was that:

> Because the new structures offered by technology must be blended with existing organizational practices, radical behavior change takes time to emerge, and in some cases may not occur at all. … The impacts of the tech- nology on group outcomes depend upon: the structural potential of the technology (i.e., its spirit and structural features), how technology and other structures (such as work tasks, the group's internal system, and the larger organizational environment) are appropriated by group members; and what new social structures are formed over time. (DeSanctis & Poole, 1994, pp. 142-143)

Like technology-triggered structural change model (Barley, 1986), the adaptive structuration theory (Desanctis & Poole, 1994; Poole & DeSanctis, 1990; 1992) considered that mediation between action and structure occurred through the recurrent use of a new technology. The explanation that Barley (1986) offered was that technological change made people communicate in a different way, which intensified the possibility of "slippages" to occur between the institutional model of communication and the demands of everyday life. The explanation given by Desanctis & Poole (1994) was that technological change caused people to develop unfaithful appropriations of the attributes of the new technology, by means of affirmation, negation, and ambiguity. The

differences introduced by DeSanctis and Poole moved the debate forward. Over time, new types of studies were developed, which resulted in the emergence of another theoretical model.

The duality of technology model

The common premise to the technology-triggered structural change model (Barley, 1986) and to the adaptive structuration theory (Desanctis & Poole, 1994; Poole & DeSanctis, 1990; 1992), i.e., that technological change triggered structural change by producing changes in communication processes, began to be questioned in a study by Orlikowski (1992). While discussing her findings, the author proposed what soon became the influential duality of technology model. The author stated that it was the use of technology itself, and not communication, that represented the dimension of "action" from which the dimension of "structure" was preserved or changed during recurrent uses of a new technology. In the model developed by Orlikowski,

> People could rebel and use the technology differently, which would then lead to change in the (organizational) structures of signification, legitimization, and domination. Thus, in the duality of technology approach, technology use becomes a constitutive feature of organizational structure. (Leonardi, 2013, p. 64)

In this model, the focus was on how people's use of technology could always lead to changes in the prevailing forms of signification, legitimation and domination. As Orlikowski (1992) argued, it was the use of technology itself that could or could not lead to changes in the organizational structure, and not communication, as suggested by Barley (1986) e DeSanctis e Poole (1994).

> As the field study shows, there are strong tendencies within institutionalized practices that constrain and facilitate certain developments and deployments of technology. In particular, understanding how different conditions influence the development, maintenance, and use of more or less interpretively flexible technologies would give insight into the limits and opportunities of human choice and organizational design. (Orlikowski, 1992, p. 34)

With this argument, Orlikowski (1992) contributed with an important change of focus in the study of the relations between the social and the material in organizations. The focus stopped being changes in communication processes resulting from a technical change and became the work practices through which technology was used on a recurrent basis. Such a change moved the debate forward and in the early 2000s new studies culminated with the proposal of a new model.

The practice lens model

Orlikowski deepened the study of technology use in work practices. More specifically, the author began emphasizing the possibility of doing differently based on the ever-present human choice, even in the face of prevailing forms of signification, legitimation and domination in the

organizational context. Over time, she increased the relevance given to the limits and opportunities of human choice, which were a bridge between the duality of technology model (Orlikowski, 1992) and the development of a new model, which privileged the reflexive capacity of human actors in their work practices. This advance resulted in the practice lens model (Orlikowski, 2000). The fundamental change initiated by this new model has also already been discussed by Leonardi (2013) and some important aspects can be summarized as follows:

> The practice lens argued that certain patterns of technology use aggregated into particular "technologies-in-practice" as people formed interpretations, in the practice of their work, about how the technology's features would help them accomplish tasks and social interaction with others. … the practice lens treats structure as if it were always in a state of "becoming". (Leonardi, 2013, p. 64)

While proposing the term "technology-in-practice", Orlikowski (2000) stated that specific structures are routinely constituted to the extent that people use specific machines, techniques, devices, or apparatus on a recurring basis in daily activities. In the explanation the author offered, that would occur because while using a specific technology, people would draw on the properties that make up the technological artifact, on their skills, on power, on knowledge, on assumptions and expectations about the technology and its use, in addition to typically being influenced by training, communications, uses and previous experiences. In brief, Orlikowski (2000) argued that facilities, norms, and interpretive schemes were used by people as instantiated rules and sources for using a technology.

> In this way, people's use of technology becomes structured by these experiences, knowledge, meanings, habits, power relations, norms, and the technological artifacts at hand. Such structuring enacts a specific set of rules and resources in practice that then serves to structure future use as people continue to interact with the technology in their recurrent practices. Thus, over time, people constitute and reconstitute a structure of technology use, that is, they enact a distinctive technology-in-practice. (Orlikowski, 2000, p. 410)

The author also stated that this constitution occurs when people interact with technologies in work practices, and that is why changes can always occur:

> Modifications to patterns of use may also result from inadvertent slippage or breakdown, when, either through inattention or error, users fall into a different form of use, such as forgetting to attach safety guards, or discontinuing use of a faulty or complicated element. People may also change their technologies-in-practice by improvising, that is, generating situated innovations in response to unexpected opportunities or challenges, such as when a temporary ma- chine workaround becomes the preferred practice because it turns out to be more effective than the original practice. (Orlikowski, 2000, p. 412)

The practice lens model (Orlikowski, 2000) was mainly criticized for suggesting that structures are only constituted in practice and therefore users have the option to choose to use technology in different ways, at any time under existing conditions. The reasons for the criticisms can be summarized as the following:

> The practice lens has been criticized for offering an overly socialized view of technology. This critique comes from the fact that the realm of action consists of people choosing to use a technology in a certain way. Here, the technologies themselves are only peripheral players that are subject to the whims of their users. … at the macrosocial level, a technology-in-practice is really nothing more than a set of norms governing when, why, and how to use a technology in a specific setting. Although technology is the object of inquiry in studies adopting a practice lens, there is virtually no technology there to be found in most empirical accounts that employ it because action (technology use), structure (technology-in-practice) and modality (interpretation) are all fundamentally social. Their theoretical formulations depend on the existence of some technology, to be sure, but we only see the reflection of that technology in the enactment of social processes in the practice lens. (Leonardi, 2013, p. 64)

Since it was proposed, the practice lens model has been criticized for its emphasis on the possibility of human choice regardless of technical attributes of the technology in use. That is why, since then, researchers have tried to revive the need, long postulated by Barley (1988a), to systematically decode the relevant technical attributes. This has been done by focusing on the material characteristics of the technology under study (Leonardi, 2007; Svahn, Henfridsson, & Yoo, 2009; Volkoff et al., 2007), or on material aspects that endure throughout different social contexts (Jackson, Poole, & Kuhn, 2002; Kallinikos, 2004; Leonardi, 2009).

In brief, over the past four decades, different theoretical models about technology and organization have been developed. Contextualized in detail by Leonardi (2013), they can be summarized as the following:

(a) The technology-triggered structural change model: suggests that technological change is a process of organizational restructuration occasioned by slippages in communication processes, which leads to changes in decision-making roles.
(b) The adaptive structuration theory (AST): suggests that technological change is a process of organizational restructuration in which unfaithful appropriations of the attributes of the new technology, made by small groups through affirmation, negation, and ambiguity, can lead to changes in rules and resources that organize social interaction at the macro level of the organization.
(c) The duality of technology model: suggests that technological change is a process of continuous organizational restructuration in which people can always choose to use technology in different ways in their work practices, which can lead to changes in the prevailing forms of signification, legitimation and domination in the organization's institutional environment.

(d) The practice lens model: suggests that technological change is a continuous process in which improvised work practices during the recursive uses of technology can always lead to a new type of recursive uses of technology.

In response to the criticisms toward the practice lens model, Orlikowski (2007, p. 1437) began addressing more specifically the relations between the social and the material, arguing that "the social and the material are considered to be inextricably related — there is no social that is not also material, and no material that is not also social". After that, the term "sociomateriality" became prominent in organizational analysis.

The popularization

Drawing on the contextualization by Leonardi & Barley (2010) and Leonardi (2013), it is possible to argue that the main reasons for the recent popularization of the notion of sociomateriality are the critiques to constructivist perspectives and the proposition of a sociomaterial ontology agenda. The latter is commonly the focal point in the current literature.

The criticisms to constructivism

Over the last decade, it has been argued (Leonardi & Barley, 2010) that, although constructivist studies deny the deterministic view of technology, they have adopted a predominantly social-voluntaristic view and therefore they are unable to address the larger question of how technology affects the social order, considering it only as an activator of social processes that, in turn, activate social phenomena. Furthermore, it has been argued that constructivist researchers are unable to address the role that powerful actors play in organizational change occasioned by technology, separating the micro institutions that emerge as a consequence of technological change from the macro institutions in which they are embedded.

While classifying and discussing constructivist studies, Leonardi & Barley (2010) emphasized the peculiarities of the different ontological orientations they encompass. However, according to the authors, those critiques are conceptually relevant because of the idea that material aspects do things that cannot be attributed to social practice[3] (Fujimura, 2006; Hutchby, 2001; Pickering, 2001). Such criticisms have fostered discussions about an ontological integration between a constructivist and a deterministic view, in addition to the overlap between constructivism and determinism, or vice versa. One consequence of such integration attempt has been the recognition, by some of the most influential scholars of technology and organizations, that the current challenge of the field is "to forge an approach that integrates, rather than alternates between, the horns of deter- minism and voluntarism", which "will require a pragmatic vision of sociomaterial reality" (Leonardi & Barley, 2010, p. 3). Thus, criticisms toward constructivist perspectives have highlighted the opportunity to focus on relations between the social and the material, which has contributed strongly to the recent popularization of the term sociomateriality. The immediate consequence was the proposal of a new ontological agenda, aiming to support the development of a perspective commonly labeled "sociomaterial ontology".

The sociomaterial ontology agenda

Arguably, researchers began discussing the elaboration of a perspective that provides a language capable of theorizing the ontological mixture between the social and the material in response to the critiques of constructivism. In the metaphor used by Leonardi & Barley (2010), it would be necessary to adopt both the view of the material determinist and the view of the social voluntarist, as in the Taoist notion of yin & yang. According to the authors, such an attempt may not bring resolution, but it may bring some transcendence after years of alternation between these two poles:

> it no longer seems necessary to continue to demonstrate that social construction occurs. Instead, what would most advance scholarship at this point in time would be theory and research that demonstrates how various social construction processes come into play and entwine with the technology's material properties, as well as with the existing social structure of the context in which it is used. (Leonardi & Barley, 2010, p. 6)

Orlikowski e Scott, who have headed this agenda, emphasize that:

> This is a relational ontology that presumes the social and the material are inherently inseparable. … this is a constitutive entanglement that does not presume independent or even interdependent entities with distinct and inherent characteristics. The portmanteau "sociomaterial" (no hyphen) attempts to signal this ontological fusion. Any distinction of humans and technologies is analytical only. (Orlikowski & Scott, 2008, p. 456)

So far, such ontological agenda has tried to respond to constructivism critics in two ways, as indicated by Leonardi (2013). The first is a language game: "Moving from a discussion about technology to a discussion about sociomateriality aims to remind those who would not normally make an explicit consideration of technology in their work to attend to the importance of the technical bases of organizational life, without using the term 'technology' directly" (Leonardi, 2013, p. 65). The second is the landmark of a transition:

> The use of the term "sociomaterial" also builds on the structurational approaches to technology, which showed that all technological artifacts were created through social interaction among people and that any effects that those technological artifacts could have on the organization of work were buffered and shaped by social interaction. Thus by moving from "technology use" and "technological artifact" to "social", "material" and ultimately "sociomaterial" one could make the philosophical statement that all action that constitutes organization is no more or less social than it is material. (Leonardi, 2013, p. 65)

In brief, the debate about the relations between the social and the material has become popular due to criticisms toward social constructivism, which denies a deterministic view of technology but adopts a predominantly social-voluntaristic view. Also duo the agenda for a

sociomaterial ontology, aiming to provide a language capable of theorizing the ontological fusion of the social and the material, by means of a new language game and a break with the assumption (from the structuration theory) that human reflexivity predominates over material agency. Given the controversies of the debate at this point, this article aims to contribute to its advance by adding a critique of the current sociomaterial ontology agenda, which has been constituted through rhetorical uses of the notion of ontology.

The criticisms

Since the call for a sociomaterial ontology, the term has become popular – and controversial, although only a few of its followers dedicate space in their work to address or respond to criticisms. Thus, the discussion that follows aims to: (a) evidence out the main existing criticisms; (b) argue, based upon the narrative previously presented, that the current sociomaterial ontology agenda has been rhetorically constituted; and (c) describe and exemplify strategies through which such rhetorical constitution operates.

The main criticisms

The most common criticisms to the sociomaterial agenda concern the high levels of philosophical abstraction, pointed out as unnecessary for the type of empirical analysis commonly presented (Leonardi, 2013; Mutch, 2013), and a negligence concerning the broader debate beyond a few references to Wanda Orlikowski (Jones, 2014).

It is possible to expand upon the list, beginning with the discussion addressed by Mutch (2013), who highlights a lack of clarity about how and why the insights obtained by sociomaterial analyzes would not have been obtained through other approaches/ontologies, less abstract or philosophical; a lack of specificity about what is considered "material" and a neglect of broader social structures, in addition to the fact that, when they considered, it is done based upon conventional/classical resources of social theory; the dependence of the researcher in relation to the perception of research participants to understand relations between the social and the material and to attribute agency to the material, resulting, contradictorily, in reports centered on human speech, of participants, despite the argument of a sociomaterial ontology; reduction of social life to the practice reflected by informants and particular contingencies observed by an external party, the researcher; and mainly the attempt to apply a sociomaterial approach seems to raise issues of power and resource dominance, approached by traditional perspectives in which concepts such as "role" and "structure" have long aided to explain what these sociomaterial investigations are intended to "unveil".

Yet another important criticism discussed by Mutch (2013), which has been discussed by Leonardi (2013) specifically about sociomaterial analyzes focused on practices, concerns temporality. As Mutch (2013) argues, as sociomaterial approaches deny social structures, they ignore the role of time in the production of particular constellations of position-practices that emerge from the activity of persons but are not reducible to that activity. Such criticism becomes even more relevant when considering that, as put by Mutch (2013) and emphasized by Leonardi

(2013), the conditions in which such practice occurs were not produced by those now here in the present of the researcher.

One can also add the lack of clarity about whether the mutual constitution between the social and the material occurs only analytically, or also empirically, since human actors – participants in a research field – "naturally" distinguish something they see as "material" apart from something they see as "social". A provocative aspect emphasized by authors like Faulkner & Runde (2012), Leonardi, (2013), Jones (2014) and Putnam (2015) and commonly not addressed by adepts of the sociomaterial ontology.

A common aspect of these criticisms is that they are drawn from arguments theoretically linked to the sociomaterial ontology agenda. Broadening the debate, another critique is presented as the following, whose originality lies in its nature, which is not theoretical, in the sense of debating and/or theoretically counter-arguing the arguments of the sociomaterial agenda, like in the preceding criticisms. The aim is to present a criticism based on the trajectory of the debate and focused on highlighting the rhetorical character of the agenda for a sociomaterial ontology.

Sociomaterial ontology as rhetoric

Regardless of the theoretical aspects involved in the discussion about a sociomaterial ontology, it is arguably that it is constituted through rhetorical uses of the notion of ontology, resulting in discussions of little relevance from the point of view of the debate itself, when it is considered in its trajectory. The main argument that makes possible – or at least plausible – the (initial) proposition of this critique is that currently the ontological issue is more central to the debate than the very phenomenon it was analyzing, which is practically ignored by most of contemporary studies adopting a sociomaterial approach. If in the 1980s Barley (1988a) called the attention of researchers to the need to systematically decode not only interpretations, but also relevant (material) technical attributes, it was as a mean to deepen the discussions about organizational structure and about the negative social consequences of the diffusion of new technologies. In the current agenda for a sociomaterial ontology, the means have become an end in itself, with little or no connection with the purpose for which they were first suggested.

As previously narrated, the debate emerged due to two key questions: What social arrangements are best suited to different technical infrastructures to achieve better performance? How does a social system ajdust to a technical system? The former reflected the relevance given by researchers such as Woodward (1958) and Perrow (1967) to the question of organizational performance in the context of the development of the English industry in the post-World War II period, guiding the later contingency theorists. The major interest was to understand how to design different organizational structures, then understood mainly as ways to specialize and integrate the work, depending on the type of technology being used, and aiming to optimize production processes in organizations operating in different environments. The latter reflected the relevance given by researchers such as Mann & Hoffman (1960), Walker & Gues (1952), and also Barley (1988a) to the negative social consequences of automation, especially the issue of deskilling and/or alienation of the worker in the context of post-World War II automation.

Thus, on the one hand there was an interest in organizational performance, aiming to solve the industry's productive problem and, on the other, a search for solutions to the negative social

consequences of that historical transition. From the theoretical point of view, the focus of the debate was on the very same phenomenon: the diffusion of new technologies at work and the subsequent implications at the organizational and social levels. At the organizational level, there was a focus on organizational structure; at the social level, a focus on consequences for labor. There is no "ontological separability" in these two questions, both portray the two sides of the same phenomenon, i.e., the diffusion of new technologies at work and the subsequent implications at the organizational and social levels.

Such phenomenon remained at the center of the debate throughout its development and consolidation. Barley's seminal discussion (1986) was about organizational structure, limited to its realignment on the occasion of the adoption of a new technology at work, which would result – or not – in a new organizational form. Subsequent influential studies continued to be interested in understanding and debating this same phenomenon: works such as those by Watson, DeSanctis & Poole (1988), Poole & DeSanctis (1990, 1992), and DeSanctis & Poole (1994) focused on the main aspects of organizational structure, e.g., work integration and decision making. Such is also the central point of the debate in the theoretical models formulated over time, like the technology-triggered structural change model, the adaptive structuration theory model, and the duality of technology model, as previously narrated.

Likewise, it is undeniable the debt of constructivist studies about technology and organizations to the sociotechnical tradition and its focus on the negative social implications of the diffusion of new technologies at work. If Zuboff's (1988) seminal study, which influenced the entire constructivist generation, is now generally evoked to justify the use of such an approach, one must remember that her central purpose was not to develop a constructivist approach for studying technology and organizations – which was a mean, not an end – , but to analyze whether computing technology would bring greater qualification or deskilling for the worker, drawing on an admittedly Marxist basis focused on the issue of alienation.

It is only when the debate becomes more popular that the interest of a new generation of researchers ceases to be the organizational and social implications of the diffusion of new technologies at work and becomes the approach itself, that is, the ontological matter. More specifically, it is possible to locate the critical point of this rupture in the Practice Lens Model (Orlikowski, 1992). Since that theoretical discussion, what was central becomes peripheral in the debate, and vice versa. Researchers begin "erasing" the phenomenon of the diffusion of new technologies and the organizational and social implications to centralize the issue of the "analytical lens", until "ontological issue" becomes the focus itself. In the influential readings of Orlikowski & Scott (2008) and Leonardi (2013), both almost purely ontological, the phenomenon is practically forgotten. Thus, accused of "material determinism" and "social voluntarism", the central questions that has made the very debate about the relations between the social and the material emerge, develop, and consolidate, then becomes "ontologically démodé" and the new fashion of organizational analysis becomes "sociomateriality" itself. The result was that the phenomenon lost its primacy over ontology, while the perspective, the analytical lens, the positioning of the researcher, etc. have practically become an end in itself.

In spite of gains already indicated by supporters of the term "sociomateriality", it is possible to enrich the debate considering the possibility that the sociomaterial ontology is constituted much

more as mere rhetoric – for publication? – rather than as an advance of the knowledge about the phenomenon, almost unknow by most of its contemporary adepts.

One of the rhetorical strategies used to justify the supposed development of a sociomaterial ontology is the **authorial randomness**, which consists of randomly selecting any "great author" and discussing their supposed "contributions" to the debate, without clarity on what broader ontological basis allows for the selection of certain authors and the exclusion of others. As an example, the influential work of Wanda Orlikowski results in an indefinite collection of articles with no clarity about the ontological thread that leads her, for example, to Latour (Orlikowski & Scott, 2008), then to Bourdieu (Feldman & Orlikowski , 2011), then to Barad (Scott & Orlikowski, 2014), ending in none other than Foucault (Orlikowski & Scott, 2015a). An in-depth analysis of such path could reveal that she goes from one to another in an ontologically indiscriminate way. Beginning with the "use" of Latour, whose work is largely the result – not the foundation – of the debate about the social and the material already existing in the socio-technical tradition, which precedes him in at least three decades. In addition to the lack of clarity on how she jumps from Latour, avid defender of a "post-science", to the Bourdieu's classic "social fields", and then to the theoretical quantum physics from which Barad works, it is ironic that at the end she reaches Foucault, whose work was almost entirely produced by analyzing the Classical Antiquity, an empirical context quite different from the current "pervasive technological diffusion" evoked by Orlikowski as justification and relevance for a sociomaterial ontology. If researchers are to preserve a minimum of theoretical historicity and ontological rigor, this randomness needs to be clarified by the sociomaterial agenda. As it does not happen, ironically, the result is that a debate whose center is an ontological agenda aiming to integrate the social and the material turns out having little or no internal ontological integration, ending up as a collection of predominantly rhetorical uses of the notion of ontology to create discussions from authors as random as they are famous.

The most capillary result of this authorial randomness is what can be called **theoretical centrifugation**, i.e., an escape – common among most studies employing a sociomaterial ontology – from the duty to discuss the sociomaterial ontology itself, supposedly under development. In other words, it is about defending a sociomaterial ontology, but merely as an "analytical (rhetorical) lens", in which the results of such analyzes are used little or nothing to contribute to the deepening of the sociomaterial ontology itself, but only to "contribute to the debate about... [anything else desired] ". For example: Stigliani & Ravasi (2012) employ sociomateriality to discuss sensemaking; Cabantous & Gond (2011), to discuss decision making; Mingers & Willcocks (2017), to discuss semiotics, and so on. Ironically, the result is that a debate whose center is an ontological agenda aiming to integrate the social and the material turns out having little or no "centripetal conceptual force", i.e., an effort to use findings from different sociomaterial studies to discuss the sociomaterial ontology itself, ending up as a collection of predominantly rhetorical uses of the notion of ontology to create a collection of discussions as diverse as they are disintegrated.

Another strategy characteristic of the sociomaterial agenda is the **conceptual procrastination**, i.e., the fact most of the concepts employed lead to the necessity of yet other concepts, and so on indefinitely, without reaching a clear conceptual *corpus* capable of bringing light on what would be an ontological fusion of the social and the material. In other words, the understanding will always come up after a new discussion based upon the use of new concepts that are still "little debated". For example: when challenging the ontological separation of technology,

work and organization and proposing a sociomaterial ontology, Orlikowski and Scott (2008) evoked a long list of concepts left to be discussed afterwards – e.g., actor-network, mingle of practices, algorithmic reconfiguration, etc. –, which has never been resumed in order to demonstrate a clear integration. Instead, the authors redirected their discussions to the notion of material-discursive practice (Orlikowski & Scott, 2015a) and began suggesting a deepening of the notion of agentic realism, based upon Barad (2007), without clarity of this direction in relation to the call made by Leonardi (2013) for the critical realism, suggested by Mutch (2013), which, in turn, had as implication a redirection to the morphogenic approach of Archer (1995), and so on indefinitely. The result is a kind of "miracle of the multiplication of concepts", in which the knowledge about what an ontological fusion of the social with the material might be will always be in the next great concept, which will unfold in as many conceptual discussions as academic sabbatical allows. A recent and influential call for papers (Beyes, Chun, Clarke, Flyverbom, & Holt, 2019) can be taken as an example of the popularity of this rhetorical strategy. The editors encourage discussions engaged on a list of about twenty "great concepts", whose common ontological basis is far from being clear, instead of directing towards an integrative aim.

Conclusions

This article aims to expand upon the debate about sociomateriality with a critique of the current ontological agenda. The originality of this criticism lies in its nature – unlike previous criticisms, it is based not on theoretical arguments, but on the integral/historical trajectory of the debate in question, and; likewise, it is not addressed to the theoretical arguments of the sociomaterial ontology, but to its own mode of development. As argued and exemplified, the sociomaterial ontology has been rhetorically constituted, i.e., by means of rhetorical uses of the notion of ontology. The relevance of this contribution lies in challenging the supposed development of a sociomaterial ontology, describing and exemplifying its rhetorical strategies: authorial randomness, theoretical centrifugation, and conceptual procrastination. Describing and exemplifying these strategies allows to expand the possibility of analyzing the current state of the debate beyond the point of view of internal theoretical argumentation (sociomaterial), but also from the point of view of the very knowledge production mode. This is relevant because the rhetorical uses indicated and exemplified have resulted in an "oblivion" of the phenomenon that has been at the center of the debate for about seven decades, and in a "glorification" of what has always been the means, and not the purpose, i.e., the discussion of approaches that might contribute to elucidate the phenomenon.

The clearest conclusion is the need to return to what is considered relevant **in** the debate from the point of view of its trajectory, regardless of rhetorical discussions on ontology. That is, the diffusion of new technologies at work and the subsequent implications at the organizational and social levels. In other words, bringing back to the center of the debate that, if researchers have been discussing the relations between the social and the material in organizations for decades, it is as a mean to understand the organizational and social implications of the diffusion of new technologies at work. More specifically, it means resuming the commitment to contribute to the theme of the organizational structure and the negative social consequences for labor of the diffusion of new technologies.

If such a return is to be sought, the main implication is the adoption of pragmatic ontologies. Pragmatics not in the sense commonly attributed by adepts of sociomaterial approaches, in which pragmatism is often understood as the replacement of social structures with situational practices, what is much closer to a pragmaticism; but in the sense of conceiving that any concept, theory or ontology should be adopted not for its relevance in itself, but for the potential it entails to explain the phenomenon under study, potential which can only be assessed by focusing on the phenomenon itself. Such a research position, therefore, obliges to reestablish the primacy of the phenomenon over the ontology, a relation that has been inverted by the sociomaterial agenda. In brief, it implies putting the question "What are the organizational and social implications of the diffusion of new technologies?" at the center of the debate, at the expense of "How to ontologically fuse the social and the material?".

Another implication is the development of critical or reflexive analyzes on the very knowledge production mode of the sociomaterial agenda. While the existing criticisms are mostly addressed from, or to, theoretical aspects of structuration theory, a reflexive criticism about how sociomaterial researchers handle theories can reveal other types of problems, such as the strategies of authorial randomness, theoretical centrifugation, and conceptual procrastination evidenced in this essay. It is by no means a matter of attributing them to the intention of the authors mentioned as examples, but of bringing them to the fore as a reflection about the very knowledge production mode prevailing in the sociomaterial agenda: rhetorical, with little ontological rigor. Further detailed analysis of this type could reveal others and even encourage counterpoints and counter arguments. Whether in the sense of contesting or reaffirming and consolidating a sociomaterial ontology, the debate as a whole shall move forward.

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Notes

1. Unlike constructionism, which focuses on the production of meanings through language, constructivism focuses on the production of cognitive processes, such as memory and learning, through intra and intergroup interactions.
2. In the original, *enactment*, a term often used in studies of technology and organizations to refer to the process of constitution (enactment) of the situated and empirically observable social order.
3. For example, the opacity of a concrete wall makes it impossible to see through it regardless of interpretation, context or social practice.

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