Imbrications or Constitutive Entanglements: A Matter of Ontologies
RESEARCH IN PROGRESS

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Scholars interested in theorizing sociomateriality debate whether social and material are discreet entities that interlock or constitutive entanglements. Prior theorizing suggests two philosophical world views underpin the debate: critical realism and agential realism. However, prior theorizing has not clearly articulated the philosophical assumptions and their relation to the debate or their influence on the used conceptions. In this research, I will relate imbrications to critical realism and constitutive entanglements to agential realism, and through juxtaposing the two expose some of the roots of the debate. The research suggests the debate can be largely explained in terms of ontological differences of each world view leading to misunderstandings and misappreciation of others' ideas. The research contributes to the debate on theorizing sociomateriality and to scholars interested in applying the world views to empirical research. This is a research in progress.

Introduction

"The fact that a perspective on sociomateriality footed on *agential realism* treats the sociomaterial as interpenetrated and as a coherent unit (the practice) means that researchers who use a sociomaterial lens *cannot show how practices become sociomaterial*; indeed, the ontology is that constitutive entanglement is simply the nature of any practice." (italics mine) [Leonardi, 2013, p.71]

As the citation above suggests, scholars interested in theorizing sociomateriality have debated whether social and material are discreet entities that interlock or whether they are constitutive entanglements (see also Kautz and Jensen [2013]; Mutch [2013]; Scott and Orlikowski [2013] Kautz and Jensen [2012]; Bratteteig and Verne [2012] for related research/commentaries). These largely different views reflect differences in the philosophical worldviews on which the theorizing is built on. Two streams of philosophical world views – agential realism and critical realism – underpin theorizing sociomateriality [Leonardi, 2013]. It seems the research on sociomateriality has become fragmented already at its early steps.

The ongoing relations between technology, individuals and organizations has been one of the most central questions in Information Systems (IS) discipline [Orlikowski and Baroudi, 1991]. Theorizing the relation between technology and social has swung like a pendulum between technological determinism and voluntarism [Leonardi and Barley, 2010]. A perspective, referred to as sociomateriality has emerged as a promising way of theorizing the relation with more balanced terms, that would neither resort to technological determinism or social voluntarism. It invites 'IS researchers to question and rethink the supposed ontological separation among the social and the technological' [Cecez-Kecmanovic, Galliers, Henfridsson, Newell and Vidgen, 2010, p.1].

The rise of sociomateriality in IS and management research can be linked to Orlikowski and Scott (see Orlikowski and Scott [2008a]; Orlikowski and Scott [2008b]; Orlikowski [2010]). Since then, another stream within the sociomateriality literature has emerged. While Orlikowski (and Scott) build their philosophical foundation mainly on agential realism, Leonardi can be linked to sociomateriality building on critical realism; thus the epithets the 'Queen' and the 'King' of

sociomateriality [Kautz and Jensen, 2013].

Leonardi [2011; 2013] conceptualized sociomateriality as a process of *imbrication* to denote the iterative interlocking of two *discreet* entities (social/human and material/technology), whereas Orlikowski and Scott [2008a]; Orlikowski [2010] conceptualize sociomateriality as *constitutive entanglements* in which 'there is no social that is not also material, and no material that is not also social' [Orlikowski, 2007, p.1437]. Bratteteig and Verne [2012] suggested a 'middle-ground' that would incorporate both views; constitutive entanglements that can be disentangled as imbrications. However, Kautz and Jensen [2012] argued disentangling constitutive entanglements to imbrications is *ontologically* incompatible with conception of constitutive entanglements that build on agential realism, hinting simultaneously that conception of imbrication is not sociomaterial (i.e., 'language finds another confusing expression in Introna's and Hayes' (2011) concept of 'sociomaterial imbrication' – the inseparability of separability [Kautz and Jensen, 2012, p.91]). Further, Jones [forthcoming] argue *relational ontonology* seems to be a common feature of sociomateriality. However, as will be discussed during the course of this article, critical realism does not fit to this categorization. Clearly, there is a need for further clarification by articulating the philosophical foundations that are at the core of this debate.

The questions that motivate this study are *what are the philosophical (ontological) differences in agential realism and critical realism that underpin the debate of discreet versus non-discreet entities* and, further, *why do these differences matter for IS research*. This study does not aim or claim for resolution of the debate, but aims to increase understanding, that contributes to accommodation of ideas. The assumption is '[t]here is no simple escape route out of this dilemma' [Pels, 2002, p.72], but rather that through appreciation and understanding of each others' ideas accommodation will follow. Thus, I do not aim to take sides on the debate but to discuss each in their own terms.

Rest of the article is structured as follows. First, a brief overview on the central philosophical concepts of critical realism and agential realism is provided. The overview focuses on concepts that have been reworked in agential realism, and thus are of significance to understanding the nature of the debate. Second, an analysis of imbrications based on critical realism and consitutive entanglements based on agential realism is provided, after which the two are juxtaposed. Lastly, discussion on the analysis is provided, conclusions drawn and suggestion for future given.

Philosophical Perspectives on Sociomateriality

Philosophical world view (or the beliefs/assumptions embedded in each view) matters as it 'delineate a way of seeing and researching the world' [Chua, 1986, p.604]. The world views can be understood in terms of beliefs of the nature of the world (ontology) and in terms of beliefs on how to create valid knowledge of the world (epistemology). Despite that both – agential realism and critical realism – are forms of *realism,* the beliefs differ greatly.

Whereas critical realism accepts the separability of ontology and epistemology, agential realism views them entangled. Barad [2007] refers to the entangled view as ethico-onto-epistem-ology; a world view in which ontology and epistemology (and ethics) are not separate but entangled concerns. Further, the foundations in relation to sociomateriality are also largely different. Whereas the ideas derived from critical realism have been developed *to explain* sociomateriality, agential realism assumes the world *is* sociomaterial in its differential becoming.

It is not feasible neither sensible to fully review either of these philosophical perspectives, and thus I will limit the discussion to aspects fundamental to further understanding on the underpinning assumptions that contribute to the confusion/debate I outlined earlier. Table 1 gives a brief overview of the aspects that characterize the debate and, moreover, they are aspects that have been reworked in agential realism [Barad, 2007, p.179].

	Critical realism	*Agential realism*
Ontology	Stratified and representational ontology. World is composed of three strata (empirical, actual, real) (see Mingers [2004a] for example). Discreet entities with individual properties exists 'out there' without our perception of them (epistemologically the entities are not, however, directly observable). Higher strata has emergent powers dependent on but not reducible to lower strata powers [Wynn and Williams, 2012]. Representational realism (i.e., language represents 'things' and language is 'more trustworthy' than matter).	Relational ontology. Denies the existence of given discreet entities with definitive borders. The primary ontological unit is (sociomaterial) phenomenon. World is composed of phenomena in their differential material becoming. Within-phenomenon intra-acting (in contrast to inter-acting) agencies are constitutive of phenomenon. Phenomenon have fluid borders that are constituted through material-discursive practices [Barad, 2003]. Non-representational, a performative perspective (knowledge-making is a practice [Barad, 2007].
Material	Material is given, discreet and concrete entities with clearly identifiable boundaries. Material have attributes stable across contexts.	'Matter is substance in its intra-active becoming – not a thing but a doing, a congealing of agency. Matter is stabilizing and destabilizing process of iterative intra-activity'[Barad, 2007, p.151]. 'Agential cuts' (in contrast to Cartesian cuts) draw boundaries enacting dualities social/material, nature/culture.
Agency	Social (human) and material agencies. Agency is an attribute of the entity to act on their own. Social (human) agency is the ability to form and realize one's goal [Leonardi, 2011, p.147]. Material agency is 'the capacity for nonhuman entities to act on their own, apart from human intervention' [Leonardi, 2011, p.148]	Social and material agencies ("posthumanist" account) that have significance only within phenomenon. 'Agency is a matter of intra-acting; it is an enactment, not something that someone or something has' [Barad, 2007, p.178].
Causality	Effects follow causes. Mechanisms cause certain effect(s). Existence of causality is criterion for existence: 'for (critical) realist having a causal effect on the world implies existence, regardless of perceptibility' [Mingers, 2004a, p.93].	Causality is to be understood in terms of intra-activity. Intra-actions iteratively reconfigure what is possible and what is impossible at any given moment. Denies determinism, but does not accept everything or anything would be possible at any given moment; intra-actions are constraining.
Time and space	Time is a referential background flowing in evenly spaced individual moments. Space is container within which the discreet entities reside.	Time and space are reworked as timespacemattering. Iterative intra-actions are generative of temporality and spatiality. Here and there, now and then are not separate points in time and space, but entanglements [Barad, 2010]. '[I]terative intra-actions are the dynamics through which temporality and spatiality are produced and iteratively reconfigured in the materialization of phenomena and the (re)making of material-discursive boundaries and their constitutive exclusions' [Barad, 2007, p.179].

Table 1: Critical realism contra agential realism in sociomateriality

Sociomaterial Imbrications or Constitutive Entanglements

As the concepts imbrications and constitutive entanglements suggest, scholars interested in sociomateriality have introduced new (or rarely used vocabulary) in order to more accurately convey the relation between social and material. Understandably, the introduction of new (or rarely

used) terminology has lead to more confusion [Kautz and Jensen, 2013]. However, introducing new terminology has been necessary, as the issues sociomateriality perspective thrives to address are not merely *ontic* and *epistemic*, but also *semantic* [Barad, 2007]. As Leonardi [2011] points out, '[th]e struggle to find a suitable image with which to describe the imbrication of human and material agencies points to the conceptual difficulty of integrating these phenomena' (p. 151). But the used sociomaterial concepts – imbrications and constitutive entanglements – express some significant nuances that reflect their underlying philosophical beliefs. Next, I will discuss some of the beliefs in relation to discussion on sociomateriality.

Critical Realism: Imbrications

Critical realism in IS discipline has been used to explain also other phenomenon than sociomateriality. Indeed, critical realism has been suggested as a possible way to overcome the positivist/interpretive dichotomy and to therefore provide a common philosophical underpinning for the IS research [Mingers, 2004a][1]. Further, past research has even asserted that most IS research already implicitly follows a critical realist stance [Smith, 2006].

The imbrications perspective assumes we live in a stratified world [Leonardi, 2013]. Indeed, the ontological assumption of world as stratified, is a central tenet for critical realism in general. For critical realism the world is stratified in three strata: (1) empirical; (2) actual; and (3) real [Mingers, 2004b]. The stratum of the real is the 'lowest' level of the stratified world and assumed to be the layer of the real, independent world of entities and structures that have causal powers [Wynn and Williams, 2012]. This real world in critical realism, exists "out there", even if we, as humans, do not experience or perceive the world. The stratum of the real cannot be directly analyzed but needs to be inferred from the higher stratum experienceable or perceivable events; (epistemologically) our knowledge of the real world is always impoverished and partial. The actual is a subset of the real that includes events (and non-events) that are generated by the lower stratum entities and structures when their causal power are enacted [Ibid.]. The highest stratum, the stratum of empirical, is a subset of actual and contains those events which we are able to experience or perceive. In another words, the real world of entities and structures, through their causal powers, creates resonance that can be then observed/experienced in the empirical stratum and, through our ingenuity, we may infer plausible explanations of the causal mechanisms that could result to observed/experienced resonance. Further, each stratum has emergent properties that cannot be reduced to the entities and structures at lower strata. Consequently, the lower stratum can never completely explain the higher stratum [Benton and Craib, 2001]. For instance, having a headache for watching computer screen for too long may be explained by physiological changes but cannot be reduced to those changes. In addition, it would not be possible to study the physiological changes of headache unless there first would be a headache.

Despite that the imbrications perspective builds explicitly on critical realist assumptions, how the imbrications fit to the stratified world view has not been explicitly addressed. In order to make the connection, it is possible to start from a transcendental question of 'what must be the case for sociomaterial imbrications to be possible?'. So what are imbrications? Leonardi, borrowed the concept of imbrication from Roman and Greek roof building, applied the concept 'as one useful way to think about the process by which the social and the material become the sociomaterial' (Leonardi, 2013, p.70). Imbrications, in Roman and Greek architecture, referred to a specific arrangement of two distinct roof tiles: tegula and imbrex: '[t]he tegula and imbrex were interlocking tiles used to waterproof a roof. The tegula was a plain flat tile laid on the roof and the imbrex was a semi-cylindrical tile laid over the joints between the tegulae' (Leonardi, 2011, p.150). In other words, imbrication is a mechanism in which two discreet and different type of components interlock with one another to form something emergent; a waterproof tile roof in Roman and Greek use of the concept, and sociomaterial in the latter use. Thus, what we observe and experience at the empirical stratum is the sociomateriality, caused by the mechanism of imbrication (at the stratum of actual) of

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1 See also Klein [2004], Monod [2004] and Mingers [2004] for a debate that followed the suggestion.

discreet entities (the social and material) in the stratum of real.

The discreet entities, social and material, have agency, that is a capability to act, differing only phenomenologically in respect to intention[Leonardi, 2011]. The social and material agencies are distinct entities but are interdependent in such a way that activities in the past condition the future sociomaterial entities [Leonardi, 2011]. The past enactments shape material affordances, that is, how the social agency perceives the capabilities of a technology.

From imbrication perspective, material has certain properties that social agency enacts through activity as material agency [Leonardi, 2011]. The social agency, on the other hand, is in possession of a mental image of the material's (technology's) affordances that reflects past enactments with same/similar technology and thus regulates what social agency perceives the technology affords (i.e., what the social agent perceives the technology is capable of doing). It is thus inherently a property of the social agency; '[m]ateriality exists independent of people, but affordances and constraints do not [Leonardi, 2013, p.70]. It is useful to think the affordances as what Duncker (1945) called as *functional fixedness*. The functional fixedness refers to the inability to use an object (material) in a new, novel way to solve a problem. As Leonardi [2013] describes a hammer 'can have many functions in that the same materiality can support driving nails into wood or holding papers down on a desk so they don't fly away' (p. 70). However, the past enactments with the technology (hammer in this case) shape whether or not the social agent perceives the material affords other uses than driving nails. The hammer's material properties afford it's use as a paperweight, but the social agent may not be able to perceive the hammer as a paperweight (i.e., the hammer is functionally fixed to driving nails in the social actors perception). Enactments with a technology shape users' perception of the technology, resulting in different sociomaterial configurations. Over time, through the social/material enactments, the imbrications of social and material (i.e., the sociomaterial) disappear from organizations/individuals view to the background as taken-for-granted sociomaterial practices[Leonardi, 2011].

The sociomateriality building on critical realism, rests on 'traditional' conceptions of time and space. The traditional conception here, refers to time as a flow events in which one event follows another and past moments are history and moments still awaiting to unfold are the future, and in which the space is a container in which discreet entities reside; '[o]rganizations and people's practices exist in time. They unfold and change along a temporal plane' [Leonardi, 2013, p.67]. Imbrications occur over time and space, as social/material are put together in different places. The process flows through time and each enactment with technology shapes the social agencies affordances of a given material (technology) that occupies a given space. Therefore, through longitudinal studies, it becomes possible to analyze the iterative interaction/interlocking (i.e., imbrication) to understand how the social and material become mutually constitutive of organizational sociomaterial practices (see Leonardi [2011]).

In order to understand the emergent nature of sociomateriality as resulting from imbrications in IS context, consider for instance a remote diagnostic of technologies. The following example serves to illustrate the interlocking of two discreet entities to form emergent features that neither, the social or the material, would posses in isolation. Jonsson, Holmström and Lyytinen [2009] studied boundary spanning practices afforded by remote diagnostics technology. The authors found that '[d]ue to machine design and safety regulations, it is impossible for humans to inspect the machines the way machines do. As a result, the sensors expand human sensing: they can monitor things that humans cannot and do this work in places where humans cannot go' [Jonsson et al., 2009, p.249]. In particular, their study shows 'how the material and social become entangled [imbricated] in new forms of boundary-spanning as technology's material features in the end both enable and constrain boundary-spanning' (p. 250). Instead of becoming entangled, re-reading their analysis in the light of above discussion, the material and social become imbricated: the diagnostics system (technology) and the human agent, as discreet agents, become sociomaterial through the mechanism of imbrication that exhibits emergent features (that is, they enable and constrain boundary-spanning). Further, in the given example, both social and technology have agencies (i.e., capability for

action [Leonardi, 2011]).

As a summary, from the perspective of sociomateriality as imbrications, 'the social and the material are indeed separate entities that are put into relationship with one another and come to appear inseparable through human activity occurring over time.' [Leonardi, 2013, p.69].

Agential Realism: Constitutive Entanglements

Agential realism is still an emerging perspective within IS, but at the core of sociomateriality discussions. As the agential realism elaborates the implications of the insights of quantum physics [Barad, 2007; Barad, 2010] it (radically) questions and reworks many of the taken for granted beliefs in, at least, Western thinking.

Whereas critical realism presupposes that the world is ontologically stratified and presupposes the separateness of social and material as discreet entities, agential realism presupposes the world is ontologically relational and the '[material and social] agencies are only distinct in relation to their mutual entanglement' [Barad, 2007, p.33]. In order to signal the inseparability, the term *constitutive entanglement* has been used in past IS literature as a way to conceptualize the relation and overcome the semantic issues [Orlikowski, 2007]. Opposed to mutual or reciprocal interaction between social and material, constitutive entanglements do not presuppose *a priori* fixed separation of the two. However, the separation of social and material into individual 'things' in themselves is so ingrained in our thinking that our concepts seems to reflect two separate things that are intertwined. According to Barad [2007] the separateness, the dichotomies of social/material, technology/organization, culture/nature, ontology/epistemology reflects a heritage of Cartesian thinking (i.e., the separation between mind/body, interior/exterior).

Instead of viewing the world as a container consisting of discreet entities (with inherent properties), agential realism shifts the primary ontological unit to phenomenon. World is composed of phenomena that are constituted by *intra-acting* agencies. However, for agential realism, phenomenon are not any *given* entities with solid boundaries. Rather they emerge from the intra-actions of "things"-within-phenomenon (i.e., agencies).

In Barad's (2007) terms agencies intra-act, rather than interact. Intra-actions, in contrast to interactions, do not presuppose *a priori* relata between the agencies. The intra-actions are causal material enactments that may or may not involve social (or "human") agencies [Barad, 2003]. However, agency is not the same as capability for action, neither is it any other property/attribute of a thing (indeed, there are no individual things, but phenomena); 'agency – rather than being thought in opposition to structures as forms of subjective intentionality and the potential for individual action – is about the possibilities for changing the configurations of spacetimematter relations' [Barad, 2007, p.230].

Agencies-within-phenomenon are not *a priori* given, but result from discursive material practices (Barad [2007] also uses the term *apparatuses*) that determine which matter comes to matter [Barad, 2007]. Apparatuses are themselves phenomenon and (also) part of phenomena they produce; 'phenomena are forever being reenfolded and reformed' [Barad, 2007, p.177]. Material is an ongoing enactment, rather than a fixed entity that awaits for representation and signification. The world, then is a phenomenon in its differential intra-active becoming.

The discursive material practices, or apparatuses, enacts cuts that mark boundaries between (social and material) agencies as "entities"-within-phenomenon [Barad, 2007]. The cutting of sociomaterial into agencies is known as agential cuts. Agential cuts 'enacts a local resolution within the phenomenon of the inherent ontological indeterminacy.' [Barad, 2003, p.815]. The indeterminacy of subject/object become locally determinate as agential cuts enact separation between matter and meaning, technology and organization, culture and nature and so forth [Barad, 2003]. It is through the agential cuts that sociomaterial becomes cut into social and material; not as discreet entities with fixed boundaries, but temporarily solid intra-acting agencies-within-phenomenon.

As Kautz and Jensen [2012] point out, due to that agencies are significant only as constitutive part of a phenomenon, it is ontologically incoherent to understand agential cuts as resulting into separate discreet entities with clear (fixed) boundaries (i.e., as Cartesian cuts). This has implications for IS as technology has no inherent properties, boundaries or meanings, but result from specific material-discursive practices within-phenomenon [Orlikowski, 2010].

In the world's differential becoming, researcher is not a mere bystander, but an active agent *part of* the phenomenon. Building on insights of quantum physics, Barad (2007) argues how and what is observed makes a particular cut. Despite that research is part of the phenomenon, the researcher does not determine what the phenomenon is, neither is the researcher irrelevant for the phenomenon, but enacts as an agency as part of the possibilities for changing the sociomaterial configurations.

Drawing further insights from quantum physics (or quantum erasures more specifically), Barad [2007;2010] reworks the notions of time and space[2]. Agential cuts do not take place in a container called space, neither over time. Rather, '[s]pace and time are phenomenal, that is, they are intra-actively produced in the making of phenomena; neither space nor time exist as determinate givens, as universals, outside of phenomena' [Barad, 2010, p.261]. This conception of time/space is what Barad [2007] refers to as spacetime(matter) (no hyphens to signal the entanglement of space/time(/matter)). It is the dynamics of intra-activity that mutually constitute space, time (and matter) [Barad, 2007]. What this reworking of time/space entails, is a shift from concerns of geometry to topology. Instead of being concerned with shapes, sizes, and distances (geometry), the focus is on connectivity and boundaries (topology) [Barad, 2003].

Within IS, in the context of virtual worlds, Schultze [2011] uses the concept of agential cuts to discuss the sociomaterial constitution of virtual world avatars:

From a performative [read: agential realist] perspective, the avatar is viewed not as a technological artifact but as an assemblage whose elements include the corporeal user and his/her immediate social and physical environment; the computer and browser he/she is using; the internet connection and the computer network that makes the virtual world and interactions with others possible; the databases, servers, and programs that render the virtual world, etc. At different points in time, however, cuts are made to distinguish and delineate different elements that constitute this assemblage, thus dynamically assigning them identity, properties and agency (p. 4).

Her example illustrates the agential cuts and the fluidity of the boundaries they enact.

As a summary, agential realism presupposes the inseperability of social and material. Instead, the world is sociomaterial phenomena in differential intra-active becoming. As the above discussion suggests, agential realism does not fix *a priori* boundaries between material/social or culture/nature, technology/human before the analysis even starts (as do imbrications), but rather enables (or encourages) genealogical analysis of material discursive emergence of the dichotomies [Barad, 2007].

Juxtaposing Imbrications and Constitutive Entanglements

As previous discussion suggests, the imbrications and constitutive entanglements build on largely different philosophical beliefs. Figure 1 depicts the imbrications (critical realism) and constitutive entanglements (agential realism). The figure is meant to illustrate the nature of imbrication as becoming seemingly (sociomaterial) one, and the nature of constitutive entanglements as sociomaterial phenomenon becoming cut apart within-phenomenon.

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2   Reworking time and space does not, however, imply that agential realism ignores temporality (as Leonardi (2013) argued).
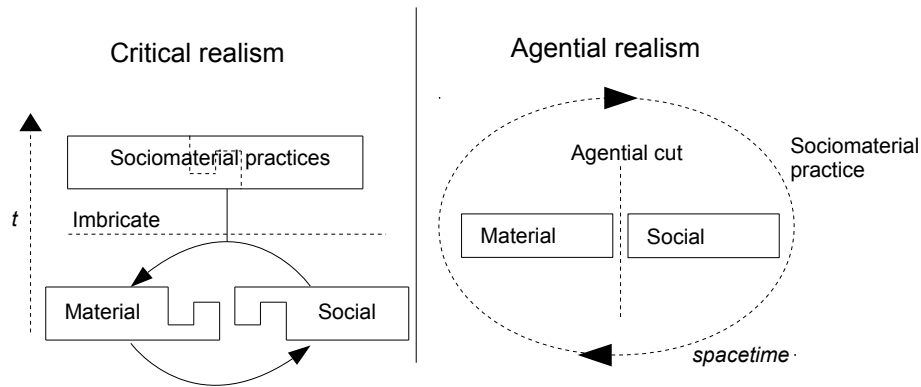
Figure 1: Sociomaterial imbrications and constitutive entanglements

The left side of Figure 1 illustrates how the distinct entities are enacted and imbricate as sociomaterial entities (or practices). The imbrications take place over time and the prior enactments of social and material shape what results from the process. In contrast to imbrications, on the right side of Figure 1 the cutting apart is illustrated. Agential cuts enact a local resolution, separating and marking the boundaries of social and material. The intra-actions of the agencies configure the boundaries and spacetime of the phenomoenon.

At this point of the research, I will omit discussion on the differences and similarities between the two views, as well as discussion on the possibilities to overcome the ontological differences (or even incommensurability).

Discussion, Conclusion and Future Research

In this article, I sought to understand differences in ontological beliefs between imbrications and constitutive entanglements. This research is a research in progress and lacks reflection of the provided discussion to past research(/debate), a thorough discussion on the implications of the two views on sociomateriality and an account of the implications of the analysis for IS research.

The two main streams of sociomateriality, critical realism and agential realism, fundamentally differ in their treatment of sociomateriality. Where the critical realism stream views the sociomateriality as being a (perceptual) illusion, agential realism assumes ontological inseparability. It is thus no wonder confusion and debates have emerged.

Going back to the argued deficiency in agential realism embedded in the quote I started from (i.e., agential realism cannot show how practices become sociomaterial) is a misappeciation of the very foundational ideas of agential realism and in direct conflict with its ontology. In a similar manner, imbrications can be seen to lack the analytical capability for genealogical analysis of how the sociomaterial becomes separated in the first place (rather than showing how they became imbricated). Therefore, the analysis here suggests if one adapts agential realist perspective, it becomes incoherent to analyze imbrications; there are no distinct entities of social and material to imbricate. Instead, the world is sociomaterial in its differential becoming. For agential realism thus, starting off from the point of social and material is already a step too far. Indeed, agential realism does not only question the duality of material and social, but goes to the origins of dichotomies themselves.

The discussion here also recognizes that two quite different views on sociomateriality exists. This view supports Leonardi [2013] view, but is different from Mutch [2013] who separates critical realism from discussions on sociomateriality. An implication of the recognition of the two views, is that the concept of sociomateriality acquires meaning in relation to a given philosophical perspective. That is, in the context of critical realism, sociomateriality is what is caused by imbrications, and in the context of agential realism, sociomateriality refers to a constitutive entanglement.

Further, the articulation of the ontological foundations also contributes to the understanding of why some researchers studying sociomateriliaty 'would seem more concerned with the combined form, or the process of bringing it about, while others would seem to have more to do with the impossibility of severing the association' [Jones, forthcoming, p. 4]. In the light of the provided discussion, it is possible to assert the different research concerns reflect the different underlying philosophical beliefs; the former reflecting critical realism, the latter agential realism.

To conclude, imbrications focus on finding ways to theorize the interaction between social and material in more neutral terms without questioning where the boundary between material and social is drawn, whereas constitutive entanglements sees the issue as a boundary issue; where the boundaries gets drawn (creating dichotomies such as social/material) and with what implications(exclusions/inclusions).

In order to avoid confusion and mis-evaluation of each others' ideas, understanding how to evaluate each paradigm according to suitable criteria is crucial. Within IS discipline, this has been a fruitful way for a plurality of (often conflicting or incommensurable) ideas to co-exist. So far, IS scholars have introduced a number of criteria to match the number of paradigms that exists within IS; a criteria for interpretive studies [Klein and Myers, 1999]; a criteria for design sciences [Hevner, March, Park and Ram, 2004]; a criteria for critical studies [Myers and Klein, 2011]; and a criteria for critical realist studies [Wynn and Williams, 2012]. However, no criteria for conducting (and evaluating) agential realist studies exists. Needless to say, the future research should provide suitable criteria for the task, in order to construct a suitable criteria to evaluate studies buidling on agential realism.

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