Does the IS Artifact Matter in Sociomateriality Research?
A Literature Review of Empirical Studies

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Abstract
A fundamental objective of IS research is the investigation of the dynamic interplay between the social and the material. As a consequence, the concept of sociomateriality has evolved to depict the interaction of the social and material in different environments, such as organizations. Although various definitions have emerged, sociomateriality remains a buzzword; however, its application in real world settings often remains unclear. Our study’s objective is to assess the IS artifact in sociomaterial research and to clarify the intertwining of the social and material agencies. On the basis of the conceptualization of the IS artifact and the dominances of the agencies, we suggest a framework to systematically evaluate the artifact’s role in sociomaterial research settings, and derive opportunities and potentials for future research on sociomateriality. Our approach will be helpful to focus greater attention on the dynamic interplay and the role of the IS artifact in sociomaterial inquiries.

1. Introduction
A fundamental objective of the information systems (IS) research is to investigate the dynamic interplay between the social and the material [1-3]. This co-constitution does not always occur in a steady way. In particular, through the digitalization in everyday life [4] and evolving Internet technologies, the social and material intertwining affords new opportunities and collaborative (working) practices [5], for example in online communities, where “people with varied access to and understanding of the work at hand, (...) must collaborate through documents of various kinds” [6, p. 1600], or in governmental work environments which have traditionally been focused on working with (digital and analogue) documents. Especially the latter example [7] showed that government documents represent more than just excessive bureaucracy. On the contrary, they provide clarity, transparency, and (social) accountability [7]. What is evident in these examples is that through interpretation and engagement with the material, activities (e.g. transfer of a document in another type of materiality [7] or the development of new documents [7]) as well as (work) practices (e.g. modification how to fill in a document [7] or planning practices [8]) change.

Thus, the interplay and enacted practices are central to explain socio-technical phenomena. Hence, one main field in IS research is studying the role of the artifact in material-discursive practices. In this regard, the concept of sociomateriality has evolved to illustrate the interaction of the social and material in different environments, such as organizations [2, 3, 9].

Since Orlikowski and Iacono [10] called for opening the black box of the IT artifact and, later, Orlikowski and Scott [2] called for giving up the “assumption that technology, work, and organizations should be conceptualized separately” [2, p. 434], a large number of researchers have expanded our knowledge of how the materials and the social intertwine and influence each other [2, 11-14]. A vast amount of papers focus on frameworks [2, 11-14], highly ontological discussions [15-18], and theoretical constructs [12, 19, 20].

Still, although various definitions have emerged, sociomateriality remains a buzzword; however, its application in real world and empirical settings often remains unclear. Accordingly, empirical papers are rare [21-24]. The various definitions describing the relation and interaction between the social and material cause the challenging application of sociomateriality. For instance, one might question whether the ontological dichotomy of the social and material is suited in any way to explain the multifaceted and inherently complex sociomaterial phenomena. Sociomaterial approaches either focus on observed practices or investigate the co-design of an IS artifact and its users in a work context to unfold “how materiality is intrinsic to everyday activities and relations” [2, p. 455]. In addition, sociomateriality...
studies in terms of practical assessment is at an early stage of development [25].

Given this background, our motivation for this research paper is twofold. First, we seek to understand how sociomateriality as a concept has been applied in empirical studies. In doing so, we hope to provide guidance for future researchers who employ the sociomateriality concept in their studies but are still uncertain how to go about it. Second, we investigate how researchers have taken into account the IS artifact in their empirical work to illustrate the idea of a day-by-day entanglement of three constitutive parts: organization, humans, and technology [2]. In particular, we are asking whether the concept of sociomateriality has the power to open the black box of the IS artifact [10].

In pursuit of these goals, we adopt the idea of agencies relating to materiality and the distinction between the social and material. Thus, we offer one alternative to explore the IS artifact and hope to open up a stimulating discussion in a broad body of work across disciplines around materiality and the perspectives of sociomateriality.

To address the aforementioned research objectives, we have reviewed the existing empirical literature on sociomateriality in three steps: First, we identified how the IS artifact was conceptualized in previous studies. Second, we analyzed the dynamics of social and material intertwining in practices. Third, we pursued the evolution and change of sociomaterial practices in a temporal perspective.

This paper is organized as follows: We begin in Section 2 with an overview of the theoretical foundations of sociomateriality and introduce our research framework, which we follow up with an introduction of our research method in Section 3. In Section 4, we present our findings and propose future research opportunities, and we finalize our examination with the discussion in Section 5 and the conclusion in Section 6.

2. Theoretical foundations of sociomateriality

The theoretical perspective of sociomateriality results from various attempts to theorize the relationship between humans, technologies, and organization, and it enriches our understanding of their interplay and dynamics. As we aim to challenge the application of the sociomateriality concept, we concentrate on the two representative foundations of Orlikowski and Scott [2] and Leonardi [11]. In particular, relying on this approach allows us to disclose the black box of the IS artifact in organizations [2] by focusing on the phenomenon of social and material intertwining [26]. However, it should be noted that many other fruitful avenues to study the phenomenon of sociomateriality exist [27, 28].

2.1. Social and material agencies

Orlikowski and Scott [2] base their argument on the idea that all (working) practices are inherently social and material and, therefore, sociomaterial. Leonardi [11] shifts the focus to social and material agencies and their ongoing reconfigurations [29]. Agencies are defined either as a capacity or quality of humans, or as a relationship or process of engagement with the social and material [30]. The social and material agencies are not fixed, but rather enacted temporally in practice. Moreover, only an agential cut [29] makes it possible to separate the entities in a particular situational context [2, 29]. Finally, the concept of agencies supports the analysis of the reciprocal intertwining of the social and material. In our understanding, the social agency is influenced by the perception of a technology and has the ability to achieve goals. The material agency (trigged but not directly controlled by individuals) is the way a technology acts, when humans approach it with intention.

2.2. Entanglement, imbrication, and assemblage

Literature discusses the reciprocal constitution of the social and material as entanglement [31], imbrication [11], or assemblage [32], each one based on a different ontology. Other concepts in literature include intra-action, interweaving, interlocking and intertwining [18].

The notion of entanglement treats the social and material as similar and inseparable, but an analytical separation (in the sense of an agential cut) is conceivable. Within this symmetrical relation, the material influences the social, the social shapes the material and every organizational process is bounded with materiality [31].


Likewise, the idea of assemblage [32] describes the relation between the social and material as components and how they constitute each other. An assemblage is a
combination of components resulting in action patterns that change over time and/or context. Depending on the components’ performance and the researcher’s ontological position (i.e. components are inseparable or separable), different assemblages lead to different sociomaterial practices. In fact, Orlikowski and Scott [2] work with the idea of sociomaterial assemblage. We correspond with that of Kautz and Jensen [33] who argue that “an assemblage is assembled and thus a priori consists of separable components. The concept of the inseparability of sociomaterial assemblages seems inconsistent and a contradiction in terms” [33, p. 2].

2.3. Sociomaterial practices

Orlikowski and Scott [2] outlined that the objects of analysis in sociomaterial studies primarily have to be practices at work. Practices are defined as what people do every day [31]. Orlikowski [31] stated that “focusing on these sociomaterial aspects of everyday practices will open up important avenues for examining and understanding the ongoing production of organizational life” [31, p. 1445]. Every-day practices are carried out through the entanglement and mutual constitution [26] of the material and social. In this perspective, only the present situation of an organization or a fixed practice is focused while the process of emergence and becoming of a practice is out of scope. Besides, it seems difficult to analyze why actions and practices emerge [12]. Other authors have defined them as routinized complexes [34] or as processes or actions [14] to produce an organizational output, and materiality always plays an important role [31]. Instantaneous practices are situated in enactment as a result of the intertwining [35].

By contrast, Leonardi [11, 12] concentrates on the social and material agencies’ imbrication as an object of analysis and how they become sociomaterial. His work is based on the social idea of practice [34, 36, 37] and state that the human, its intelligence and understanding, as well as emotions and actions dominate and perform the practice. We agree that while, “organizations and people's practices exist in time” [12] or in everyday working flow [38], it is crucial that an observable practice in the study of sociomateriality always be tied to a particular time period. In other words, considering a temporal dimension allows to determine how practices emerge and change over time [39] and how the reconfiguration of agencies leads to new practices.

2.4. Research framework

Given the background discussed above, we encourage the attempt [2, 31] to foreground the material and assess whether the sociomaterial approach discloses the black box of the IS artifact. Our research framework outlines that we focus on three major abstraction levels (marked with circled numbers in Figure 1). First, we consider the material’s conceptualization in literature. We are interested in how well a particular conceptualization helps researches to open the black box of the IS artifact [10]. Second, we interpret the dynamic intertwining of the agencies in the papers and the role and impact of the social and material agency on the resulting practice. Finally, we analyze the papers with regard to observed sociomaterial practices. Thus, we concentrate on the practice itself and on how it emerges or changes over time.

![Figure 1. Review framework](image)

3. Research approach and method

To address our objectives, we performed a literature review of sociomateriality and sociomaterial practices. We rely on established guidelines for reviewing and synthesizing literature [40-43]. As the basis for our review, we used the eight journals listed in the AIS Senior Scholar’s Basket of Journals, as they represent the top journals in our discipline (Table 1).

1 http://aisnet.org/general/custom.asp?page=SeniorScholarBasket
We also included the Scandinavian Journal of IS, since it has published various articles on sociomateriality. In particular, we found three articles supporting the understanding of the theoretical discussion [18, 33, 44] and one of our findings [45] in this journal. Furthermore, we included three major international IS conferences since they provide access to the most recent developments in the field [42, 46]. While a database search may have resulted in a larger number of potential articles, we wanted to control for the quality and relevance of the papers from the start [47].

We started our literature review by searching article abstracts, titles, and keywords for the strings “sociomaterial,” “sociomateriality,” “social materiality,” “socio-material,” “socio-materiality,” and “sociomaterial practice.” Additionally, backward search assured that we would not miss relevant articles published in other journals [43, 46]. We also analyzed recent review articles on sociomateriality for additive relevant sources [26, 35]. Our selected time frame ranges from the early beginnings of “rethinking the concept of technology in organizations” in 1992 [48] until January 2015. Our search yielded 171 papers in total. From these papers, only those that applied an empirical research setting were included for in-depth analysis. 68 papers fit this criterion.

In the next step, two researchers independently reviewed every identified paper’s relevance according to the following criteria: First, the paper had to be engaged in deeply describing sociomaterial practices or theories. Second, papers concentrating on affordances or social affordances were excluded since these do not allow a direct link with sociomateriality. In case of disagreement, we clarified a paper’s relevance in a joint discussion. After this step, 25 papers were left over which we reviewed in detail using established classification criteria of reviews in the field of sociomateriality [2, 26, 35].

All of these 25 empirical papers were published between 2010 and 2014, which indicated that researchers started only recently to transfer the concept of sociomateriality to a more practical realm. These papers involve 16 case studies, five field studies and four other empirical research methods. Considering the area of application, three studies were conducted in the automotive sector [49-51], two in health care [21, 35] and two in the governmental environment [45, 52]. Other areas of application range from education [22], the oil and gas sector [53], space science [54], nuclear research [55], and the travel industry [23]. Interestingly, we found that seven of our reviewed articles [53, 56-61] either discussed the practice in highly abstract terms or did not focus on practice at all.

4. Findings

4.1. Conceptualization of the IS artifact

One major objective of our research is to identify how far sociomaterial studies have incorporated the artifact in their investigations. Researchers have approximated the IS artifact with four apparently different conceptualizations of the artifact, described in terms of affordances, capabilities, features, or technical components.

Our analysis illustrates that more and more scholars rely on the conceptualization of features and components. Yet, the artifact itself remains under-theorized, even though the digital and intangible properties are deeply interwoven in our lives. We reflect on reasons for selecting a particular type of conceptualization for the analysis. In particular, we consider whether academics intend to produce an outcome that is different than to the concepts of affordances or capabilities. Moreover, we are interested in the implications of this trend of acknowledging the real properties of an artifact and what kind of coherences is seen between the artifact and the analyzed practices.

4.1.1. Affordances and capabilities. Keeping in mind that we seek to open the black box of the IS artifact, we start with the two conceptualizations that are affordances and capabilities: Affordances display the least artifact-related conceptualization since they use a social perception of what an artifact can do. According to Heft [62] affordances say nothing about the real properties of objects they result from their usage and the relations between the user and the technology.

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Similarly, capabilities also consider an artifact as a bundle of abilities rather than a technical system with existing properties [63]. Hence, neither conceptualization alone is suitable to unpack the artifact in sociomateriality. Seven publications in our sample relied on one of these two conceptualizations. For instance, affordances described the role of the material agency of generative support applications [61] or showed the entanglement of the digital visualization board and the medical staff [21]. But we found no detailed insights into the IS artifact itself.

We conclude with the same findings of an opaque IS artifact for authors like Zheng [58] and Hylving and Schultze [50], who worked with constraints and perception and therefore in the broadest sense with affordances. Moreover, the conceptualization of capabilities was applied in the case of ES implementation and its best practice approach [22]. The whole system and practice were vaguely discussed, and the IS artifact remained covered. These findings were in line with the results of the studies of Stein, Galliers and Markus [60] and Mikalsen [53]. These authors either described a practice with the social and material agencies without analyzing the artifact itself [60], or focused much more on the social agencies instead of the IS artifact [53].

4.1.2. Features and components. By contrast, publications using features as functional building blocks of an information system [64, 65] or technical components specifically consider the real properties and characteristics of artifacts. They mostly enfold a rich and detailed perspective of material agencies. Therefore, we argue that researchers building on this view are able to derive more precise and differentiated insights on the entanglement between the social and material agencies. In our sample, eight publications relied on these conceptualizations, for example, on the components of a RFID technology [51] or of home LANs [66]. We found various technical components such as the role of the frontend of a database model and pivot tables to interpret the IS development in action [67], and a component-based logic [49], that centered on the implementation of an architecture such as an IS artifact (instead of a technology). A second component based study used various materialities of computing grid infrastructure to analyze digital coordination by recognizing the material [55]. In brief, other authors conceptualized features of a wiki [68], of a crowd funding website [57], and finally the functional building [69].

However, in four papers [54], [23], [45] and [70] we did not find any clear conceptualizations. In addition, two publications could not clearly be classified within our framework: On the one hand, Cecez-Kecmanovic, Kautz and Abrahall [24] considered various technical components such as the rule-based engine or the mainframe. On the other hand, these components were rather described in terms of their functionalities and capabilities. Furthermore, Riemer and Vehring [59] relied on features within their testing of usability as a property. But defining usability as sociomaterial routines and discussing how sociomaterial entanglements influence the perception of technologies do not match with our definition of sociomateriality.

Based on our discussion above, we suggest the following research opportunities:

Research Opportunity 1: Researchers should continue with the positive trend to work with features and components to conceptualize the IS artifact in sociomaterial studies.

Research Opportunity 2: Future researchers should also investigate whether particular types of conceptualizations are better suited than others to study specific phenomena and outcomes.

4.2. Dominating agencies and dynamic intertwining

In this section we focus on the process of becoming or the emergence of a practice through the intertwining. “Sometimes, human and material agencies interweave in ways that create or change routines, and other times, they weave together in ways that produce or alter technologies” [11, p. 151]. We experienced that an agential cut in time or space helps to assert these dimensions and to analyze the role and power of the IS artifact in the intertwining. Our particular interest is whether an agency sometimes dominates the intertwining and why. Therefore, we clustered our papers and found five papers with material dominances at some point in time, another five with a social one and four with no dominance or a balanced interplay between the social and the material (Figure 2).

Figure 2. Varying dominances of social and material agencies

We confirm that the IS artifact and technology are shaped and obtained their attribute through ongoing reconfigurations. The intertwining of technology, user, organization and tools result in an enactment of the IS artifact in sociomaterial practices. In general, scholars are capable of showing the intertwining between the
social and material and their shaping process in their studies. However, the mutual constitution that occurs in notions of inseparability is very complex. In other words, based on the foundation of Orlikowski and Scott [2] sociomateriality is processual and the differentiation is impossible, as only an “instance of practice” [35, p. 919] is in focus. Furthermore, the intertwining is often invisible. It is also apparent that other properties, features, constraints or norms of both agencies are ignored during the analysis of the performed practice. To interpret the dominance of agencies, we take into consideration, that the social agency is characterized by deliberateness and intentions, whereas the material agency is unintentional and explored by the social agency in emergent practices [39].

4.2.1. Material dominances. Jones [35] reports a substantial example of strong entanglement with the technology. Clinical practice was modified through the change of materiality (paper to electronic record). The technology itself also seemed to be experienced as a virtual patient. Both were seen as inseparable. In the same way, Doolin and Mcleod [67] showed how the material artifact (prototype), the social agency (project member), and their dynamic interplay generated various options for knowledge sharing and meaning creation. The material configures the practice. Next, the artifact (layered architecture) dominated the process of intertwining and changed the digital innovation process as well as social structures (including power structures). The artifact itself attained a stronger position [50]. Subsequently, the introduction of a wiki [68] changed the working practice into decentralized dynamic content generation. The unit of analysis was the intertwining, and through repeated resistance and accommodation with the technology, an incremental transformation of working practices occurred. Finally, one paper concluded that only the technology features support the change of presence, not the human agency [69].

4.2.2. Social dominances. A study on stepwise institutional changes [21] proved that the social agency (intention of the medical staff) and the material agency (digital visualization board) involved in a dynamic interplay include a change in either practice or technology. This stepwise co-constituting process resulted in new entanglements, while the social agency dominates the process. Similarly, humans dominated the process of intertwining in an innovation process and overcame the tension between the digital and physical materiality by means of a continuing dialectic [49]. The analysis of social computing showed that the perception of constraints led to a change of technology.

Next, in developing an understanding of project survival [22] the artifact was experienced as disruptive. Thus, a dialectic process of resistance and accommodation occurred. The project and its survival could only be achieved through negotiation and the constitutive adaption of the technology. In the study of an online e-business service tool for insurance brokers [24], the intertwining and agential cuts resulted in documentation with specified meaning, a technology with other features and people performing differently. In other words, through the intertwining a transformation of relations, boundaries and properties appeared. The social agency dominated the process, whereas the IS artifact nebulous.

4.2.3. No dominances. We found that way in which material and social were constituted and changed and how they changed their relevance within a process of dynamic reconfigurations [54]. A new analysis tool adjusted the work of NASA scientists the organization as well as the mission whereas the social and material influences were in balance. In addition, these authors investigated whether if one of the components shifts, the other is reconfigured too (reciprocity). Similarly, the complete design and testing process of software designers [51] was intertwined with the material components of the technology and a business strategy alternate from solution provider to integrator occurred. From our point of view, the intertwining of the social and material and their influences on the practice were even-tempered. Likewise, an analysis of anonymity [23] illustrated that various forms of hotel ranking occurred through agential cuts. Lastly, Venters, Oborn and Barrett [55] concentrated on “the human–material “mangle”—an unstable and evolving sociomaterial configuration” [55, p. 931] instead of the social or material.

In summary, our literature analysis indicates that artifacts and configurations of the social and material agencies have different impacts on the intertwining. Furthermore, we recognize that the dominating agencies changed within the study when scholars add the time dimension to their applied research. Based on our discussion above, we suggest the following research opportunities:

Research Opportunity 3: Future research should evaluate whether an agency’s dominance is influenced by intention, dependent from context or is just a result of randomized incidence.

Research Opportunity 4: Future research should also evaluate the conditions under which a specific agential dominance occurs and why it changes.
4.3. Evolution and change of sociomaterial practices

While studying the dominances of social and material agencies and the intertwining, we recognized that dominance and practice changed in the study when scholars added the time dimension to their analysis. Hence, our interest in this section is to debate how this evolution over time and the becoming of the social and material in organizations occurs [12]. Jones argues that “exploring the variety of ways in which [practices] in different settings and at different times change […] offers insights on the range of influences on […] practices that might be overlooked by viewing them simply as instances” [35, p. 919].

In our review, we found that the interplay of the material and social sometimes occurs in sequential steps. For instance, in the study of physical and digital visualization [21] we see that new routines resulted in new technologies. Obviously, one technology constitutes and develops the other. The social agency shapes the process, and moreover, explores the material in everyday work. As the team afforded constraints or had negative experiences they did not change their practice. In the next period of time, as the staff perceived a need to improve work practices, the technology changed. A new social and material entanglement occurred. During the subsequent time frame, as the material agency was perceived to offer affordances (e.g. broaden understanding by visualizing data), the team changed its operational work. Again, a new entanglement between the social and material occurred. This interplay between the social and material agency emerged in sequential steps, meaning it happened alternatively again and again. The will and motivation of the human resulted in changing the technology. Moreover, the dominances of the social and material changed at irregular intervals.

Next, we explored how these routines and the interplay between the social and material changed dynamically or in parallel. Also, the dominances of the social and material changed without any regularity: In a clinical care study [35] a change of materiality (from the patient’s paper to an electronic record) led to an ongoing interplay between the social and the material in enacted situated practices. These practices occurred at various locations inside a hospital. The author discovered that the staff changed its working practices because of the materiality. In fact, the treatment of the patient altered. Moreover, the staff carried out fewer examinations and visits to the patients’ bed but consequently performed an intensive review of the electronic data. In another context and over a certain time period, the communication behavior altered because of extensive accessible electronic data. This data caused time-consuming communication processes during daily ward rounds. The quality of the nursing notes also changed. Interestingly, these practices were accompanied by norms, emotions and power games. Sometimes parallel and façade routines occurred, became stable and then changed. From time to time, agency dominances switched. The constitution of emergent practices and their changes was irregular and there was no indication of defined cycles or sequences.

In summary, our discussion of two cases demonstrates that various practices are carried out over multiple dimensions of time and are being shaped by varying agential dominances. This intertwining sometimes occurred on a regular basis, and at other times on an irregular or parallel basis. The literature illustrated that sociomaterial practices often appear to be affected by small and nearly invisible changes occurring unpredictably or not fixed to a specific point of time. Based on our discussion above, we suggest the following research opportunity:

Research Opportunity 5: Future researchers should investigate whether and how the time dimension supports the understanding of when and how the dominances of the agencies and thus practices change over time.

5. Discussion

The aim of our research was to explore the IS artifact in the empirical sociomateriality literature. In particular, we investigated how the artifact and the material were conceptualized and linked to each other and to work practices. Our findings emphasize that scholars may benefit from disclosing the artifact's conceptualization in sociomaterial inquiries for various reasons: First, while studies concentrating on features and components provide access to the more physical properties of an artifact, those focusing on affordances and capabilities are closer to the more intangible ones. Second, unboxing the conceptualization of the IS artifact can help to sharpen the discussion on the mutual constitution of the artifact and work process [54] by highlighting “the importance of physical objects in work tasks” [71, p. 1764]. Third, the artifact and the configurations of the social and material agencies have different impacts on the intertwining and emergence of practices. Disclosing the artifact’s conceptualization supports examining the varying dominances of the social and material and interpreting the role and power of the IS artifact in the intertwining.

Beyond these benefits, our literature review also shows that studying organizational practices using a separation between the social and material is a challenging endeavor, for example, if studies shift their research aim from analyzing impacts, influences, and
interactions “to examining how materiality is intrinsic to everyday” [2, p. 455].

6. Conclusion

The goal of our review was to examine whether Orlikowski’s and Scott’s [2] pursuit of foregrounding the material in the sociomaterial approach has been put into practice. In particular, we questioned whether sociomateriality meets the expectation to disclose the IS artifact. Furthermore, we explored if sociomateriality offers new insights into the interplay and dominances of the agencies to understand everyday working practices. Based on a review of existing empirical sociomaterial studies, we propose an integrative framework that covers the main constituents of sociomateriality: the conceptualization of the IS artifact, the intertwining of the social and material, and sociomaterial practice. In addition, we add the time component to demonstrate the evolution and change of practices.

Our work contributes to the literature in three ways: First, we support classifying the conceptualization of the IS artifact and investigating the effects of different conceptualizations on the results of a study. Second, we explore the dynamics of dominating agencies and offer starting points for studying the conditions under which these dominances occur. Third, we provide insights into the reconfiguration of practices in regular or irregular cycles. Practitioners will benefit from our findings as they offer more clarity on the material-discursive intertwining process and highlights new directions for sharpening the sociomaterial inquiries that need to be considered.

With these contributions in mind, our work has limitations. First, our literature search and classification process might be biased due to our choice of keywords, journals, and subjective interpretations during the paper selection and classification processes. Thus, we cannot rule out that publications that other researchers deem relevant were not considered here. We also intentionally decided to leave out related research streams to keep the review manageable. Also, we acknowledge that the isolation of materiality and the separation in social and material agencies are a challenging undertaking. In fact, we were also faced with the ontological dichotomy of the social and material. In particular, while analyzing sociomaterial practices, we have experienced that they do not always occur in sequential steps. Determinants are often implicit and the interplay between and dominances of the social and material changed dynamically or in parallel. However, to reach our research goals, framing the social and material agencies in the way we did it was valuable for the reasons outlined in section 5.

Despite these limitations, we believe that our insights have a sound theoretical grounding and that we did not overlook critical aspects. We believe that future researchers and practitioners will benefit from our work, because it sustains and further develops the concept of sociomateriality, unboxes the IS artifact, and combines both in empirical studies.

7. References


