

Advancing Qualitative IS Research Methodologies: Expanding Horizons and Seeking New Paths

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1 Introduction

The purpose of the special issue is to foster and contribute to methodological advances of qualitative research, including new philosophical approaches and innovative research designs and methods that enable more profound, critically engaged, practically relevant, and reflexive insights into information systems and organizing in the digital era. With this special issue, we seek to reignite the debate about methodological questions and invite information systems (IS) scholars to think differently about emerging and increasingly intertwined social and technological phenomena and explore bold visions and methodological innovations in conducting IS inquiries.

In our enthusiasm for building on the rich tradition of epistemological and methodological debates in IS and social sciences more broadly, in the call for papers we announced that the special issue aims to:

1. Provide an unconventional forum for a critical reflection and wide-open debate on fundamental issues in IS research: paradigmatic and philosophical foundations, epistemological and methodologies choices,

and implications for knowledge production, justification, and relevance;

2. Stimulate epistemic developments above and beyond the well-trodden methodological paths to encourage and equip IS researchers to grapple with the complex and emerging IS phenomena of the digital age; and
3. Advance IS research by proposing, developing, and showcasing new, visionary and innovative qualitative research methodologies and methods/techniques, and illustrating their contributions to knowledge creation.

We now realize that such aims were too ambitious and that if this special issue achieves them only partially it will be a significant accomplishment. Each of the four papers comprising this special issue (described below) makes a distinct contribution to epistemic developments, showcases innovative qualitative research methodologies, and pushes the boundaries of knowledge creation. The papers, we believe, demonstrate that these aims motivated and perhaps liberated the authors to explore beyond the established methodological paths and venture into uncertain epistemic terrains. If anything, this special issue

demonstrates that these aims are not unrealistic and that we, as the scholarly community, have matured enough to challenge the state of qualitative research scholarship and expand beyond the expected, the well-rehearsed, and the regulated.

More broadly, this special issue continues conversations reopened in recent *JAIS* editorials (e.g., Sarker et al., 2018a, 2018b) about the nature of qualitative inquiry and the limitations and contradicting demands imposed by the prevailing methodological standards of qualitative scholarship. In this sense, we also join debates in organization studies and management about the lack of diversity in metatheoretical foundations and methodologies in qualitative research (Bansal & Corley, 2011; Bansal, Smith & Vaara, 2018). Such conversations are critically important for our shared understanding of a variety of methodological standards and practices and for questioning those that obstruct rather than support knowledge creation and thus impede rather than enhance research quality. We hope that this special issue will trigger further debates about the kinds of qualitative inquiry needed to open new avenues for researching and encourage new ways of seeing complex, intractable, and uncertain phenomena as they emerge in our increasingly digitized world.

We believe that IS qualitative researchers of all persuasions and expertise levels, and PhD students in particular, will benefit from this special issue. They will be inspired and encouraged by the examples of how qualitative research can be advanced by questioning and deepening the philosophical underpinnings of qualitative methodology and by innovating research designs and methods of data collection and analysis. At the very least, PhD students and researchers (as authors, reviewers, and editors) can use this special issue to broaden their views and learn to question the “orthodoxy” of the qualitative research methods they were taught or those imposed via journal review processes.

In response to our call for papers, 42 manuscripts were submitted. The submissions were reviewed and assessed by the senior editors and the members of the editorial board who generously contributed their time and expertise. After a thorough review process, four papers were selected for inclusion in the special issue. While the selected papers do not cover the whole spectrum of qualitative research genres that we hoped for, each of the papers exemplifies significant methodological advances of broader significance for qualitative inquiry in IS and beyond.

The first paper titled “Building an Apparatus: Refractive, Reflective and Diffractive Readings of Trace Data” by Kevin Crowston, Carsten Oesterlund and Corey Jackson, addresses methodological challenges involved in investigating digital trace data

routinely generated by information systems in a wide variety of organizational and everyday practices. These heterogeneous data, spanning transaction logs, conversation transcripts, and source codes, are important, as they track activities and events at a granular level, unfolding over time. In such a way, the authors emphasize that information systems may serve as “research apparatuses” that enable the investigation of numerous phenomena with vast potential for discovery. To unleash this potential, the paper adopts a sociomaterial metatheoretical view, taking ontological inseparability of the social and material as its point of departure. Drawing from Haraway (1997) and Barad (2007), the paper advances sociomaterial scholarship and makes an important contribution to sociomaterial methodology. More specifically, the paper furthers the *diffractive methodology* and articulates a set of guiding methodological principles and strategies that help reveal how trace data ripple through an apparatus, how agential cuts make distinctions and draw the boundaries of a studied phenomenon, and thus help establish the conditions for causal relationships and agency. Such diffractive methodology draws together qualitative and quantitative research practices in new and productive ways, enhancing our ability to study the dynamic and often invisible sociomaterial practices found in contemporary digital world.

The second paper, titled “Pluralist Theory Building: A Methodology for Generalizing from Data to Theory” by Sune Müller, Lars Mathiassen, and Carol Saunders, addresses two perennial questions in qualitative research: (1) inductive theory building, grounded in the empirical data, and (2) adoption of multiple paradigms in the theory-building process. They do so by proposing *pluralist theory building* as a methodology that involves moves between empirical data (descriptions) and theory, and between single and multiple perspectives through four iterative, mutually entwined steps: creation of (single) perspective accounts, synthesis of a multiperspective account, creation of theory fragments, and synthesis of pluralist theory. By articulating the pluralist theory-building methodology and by demonstrating its benefits and practical applicability, the authors make a distinct and important contribution to qualitative research methodology. Pluralist theory building presents a novel and practically feasible approach to inductive theory building that draws from Mingers’s approach to pluralism (2001) and extends Lee and Baskerville’s (2003) generalization framework. The proposed detailed process of pluralist theory building together with steps, deliverables, challenges, and activities, will help qualitative researchers in designing and conducting pluralist inquiries and building novel theories inductively from empirical data.

The third paper “Recent Advances and Opportunities for Improving Critical Realism-Based Case Study Research in IS” by Donald Wynn and Clay Williams, addresses methodological challenges involved in conducting critical realism-based (CR-based) case study research. The paper reviews key references (published in the “Basket of Eight” IS journals) in the methodological and empirical literature with a focus on addressing the following three questions: (1) What is the purpose of a CR-based case study? (2) Given the typical focus on mechanisms as a means of explanation, how are mechanisms identified? (3) What is the process by which CR-based case study research is conducted? Wynn and Williams identify three state-of-the-art practices among case researchers using the critical realist paradigm. These three useful groups of identified best practices (centered around the purpose of CR-based case studies, defining and presenting mechanisms, and CR-based processes) will help advance the quality of CR-based case research and clarify how it should be evaluated.

The fourth paper “Developing Theory Through Integrating Human and Machine Pattern Recognition” by Aron Lindberg also addresses the use of digital trace data, which are increasingly ubiquitous, heterogeneous and unstructured (e.g., text, images, video recordings), and available as raw material to qualitative researchers. Due to the nature of digital trace data and the sheer enormity of typical trace datasets, the use of traditional qualitative data analysis methods (such as grounded theory or thematic analysis) is highly limited and practically impossible. To overcome such an important limitation of qualitative research, the author proposes a research framework for an abductive inquiry, based on the philosophical tradition of pragmatism, that integrates human pattern recognition and machine pattern recognition (computational tools that identify regularities in data) in an iterative abductive process of theory building. This abductive process involves iterations between discovery and justification. Importantly, the author emphasizes that neither the trace data nor the patterns identified by computational tools speak for themselves; thus, they require the interpretation and imaginative capacities of researchers to continuously create inferences and possible correlations, hypotheses, or causal processes and ultimately question extant theories and develop emergent theories. To assist researchers in the adoption of the framework the author proposes guidelines for “mutable digital traces” and for “discovery and justification” and illustrates their use in three published examples. The proposed framework of abductive inquiry together with the guidelines and evaluation criteria present an important contribution to qualitative research methodology.

To put these papers and their contributions in a broader context, we first briefly reflect on the emergence and

maturing of qualitative inquiry in social sciences and then discuss the evolution of qualitative research in IS. Next, we present our view on some emerging methodological challenges and discuss the need for methodological advancement. While doing so, we reflect on the papers in this special issue and on the ways in which each makes a specific contribution to these challenges and advances our conversation about the new ways of conceiving and conducting qualitative inquiry.

2 The Coming of Age of Qualitative Research

In the social sciences, qualitative inquiry emerged in the early 1970s as a reformist movement committed to questioning, critiquing, and transforming social scientific research (Schwandt, 2000). As it expanded, the movement contributed to unsettling the reign of positivist epistemology in social sciences, including, with some delay and trepidation, IS. Such unsettling was exemplified and at the same time sanctioned by Burrell and Morgan’s (1979) model of paradigms that recognized nonpositivist paradigms (the interpretive, radical humanist, and radical structuralist) alongside the positivist (functionalist) one. Importantly, this model opened up an intellectual space for qualitative inquiry to emerge and flourish underpinned by diverse philosophical positions. As a result, scholars of different philosophical persuasions and often irreconcilable epistemological stances have been attracted to qualitative inquiry. As Schwandt (2000) observes:

Qualitative inquiry is more comprehensible as a site or arena for social scientific criticism than as any particular kind of social theory, methodology, or philosophy. That site is a “home” for a wide variety of scholars who often are seriously at odds with one another but who share a general rejection of the blend of scientism, foundationalist epistemology, instrumental reasoning, and the philosophical anthropology of disengagement that has marked “main stream” social science. (Schwandt, 2000, p. 190)

The emergence of qualitative inquiry was motivated by the need to overcome the serious limitations implied by positivist social science and the hypothetic-deductive logic of inquiry. The qualitative inquiry movement made a significant difference: it opened new territories for conducting research in the social sciences, beyond and above what was possible and desirable in the natural sciences. Qualitative researchers problematized the underlying essentialist assumptions of positivist social science that human beings, things, and other entities are given in reality,

distinguished by their properties and relations to other entities that are empirically evident. They also disputed the ideal of an objective, detached, and neutral researcher, who, by applying rigorous scientific methods, produces objective and value-free nomothetic knowledge. Most importantly, qualitative researchers discovered and brought attention to *context* and the relevance of historical, cultural, and social backgrounds for understanding social actions (Weber, 1981). Understanding social action and other social phenomena in a context became a demarcating feature of qualitative inquiry (Denzin & Lincoln, 2000). As a reformist movement, qualitative research also advanced inductive theorizing grounded in data that enabled and stimulated the creation of novel concepts, perspectives, and understanding unachievable through hypothetic-deductive research (Bansal et al., 2018).

A particular differentiation of qualitative inquiry as a reformist movement, however, gradually changed with its increasing acceptance and legitimation in academic outlets and across the social sciences. We might say that the comparative success of qualitative research in the social sciences, including organization and management studies and information systems, in the 1990s, has transformed the movement in important ways. Qualitative inquiry became less focused on social scientific criticism and gradually evolved to include the broadest range of research approaches from Burrell and Morgan's (1979) model. As a result, qualitative inquiry became distinguished by the nature of data: qualitative rather than quantitative. Such distinction was conducive to broadening the spectrum of philosophical positions and related types of qualitative studies (both positivist and nonpositivist). While this contributed to the increased variety of qualitative studies, their mutual differences (metatheoretical and methodological) were neither well understood nor recognized.

At the same time, qualitative inquiry became more concerned with its own justification, regulation (of appropriate ways of doing qualitative research and developing knowledge claims), and institutionalization. As a consequence, qualitative studies have become more focused on the research method as the key driver and arbiter of the quality of empirical studies (Cunliffe, 2011). The notions of rigor, validity, and reliability as measures of quality tended to be applied across the types of qualitative studies, disregarding their metatheoretical differences. The overemphasis on methods, their selection and execution, together with a narrow view of research quality, have been debated and critiqued since Morgan and Smircich's (1980) landmark article "The Case for Qualitative Research". Qualitative researchers are at risk, Cunliffe argues, of shaping their research according to methodological obligations and reducing their work to a "choice about method, which then

obscures differences between perspectives and orientations to research" (2011, p. 648).

Such trends limited the types and nature of qualitative research and narrowed methodological choices, and thus artificially constrained the breadth and depths of insights from qualitative inquiries, dulling their critical edge (Bansal et al., 2018; Amis & Silk, 2008). The ongoing debates and critical reflections on qualitative inquiry across the social sciences call on qualitative researchers to fight against hegemonic tendencies and embrace and experiment with a variety of metatheoretical perspectives and methodological choices (see, e.g., Amis & Sild, 2008; Bansal et al., 2018; Bansal & Corley, 2011; Gehman et al., 2018). More fundamentally, researchers are calling for continual reflection on what it means to be a responsible social inquirer who is affected (advantaged and disadvantaged) by our inquiries and how we grapple with the ethical, moral, and axiological questions that permeate the contemporary world (Schwandt, 2000; Amis & Silk, 2008).

3 Qualitative Inquiry in Information Systems

These broader developments of qualitative inquiry have been reflected in the IS discipline. Up until the end of 1980s, the quantitative-positivist approach in the IS research outlets was evidently dominant, enacted as a "supremacist" view of the mainstream (Fitzgerald & Howcroft, 1998; Sarker et al., 2018a, p. 754). However, important attempts were made to break the mold and introduce qualitative inquiry and adopt nonpositivist epistemologies, with the 1984 IFIP Working Group 8.2 Manchester Working Conference (Mumford et al., 1985) marking a distinct milestone. Klein and Lyytinen (1985), for instance, launched a serious critique of the "poverty of scientific approach" as a sole paradigm in IS research and its blinding effects on IS researchers and practitioners. Similarly, Galliers (1985) focused his critique on the failure of the scientific approach in exploring and understanding the social nature of IS phenomena. Based on their review of IS publications in four outlets, Orlikowski and Baroudi (1991) demonstrated how the dominance of positivism limited IS research with far-reaching consequences for practice. They argued for opening up IS research to other philosophical assumptions and related paradigms—specifically the interpretive and the critical—in order to enable adequate investigations of the social processes involved in the introduction, application and use/misuse of information technology (IT) in organizational contexts.

Qualitative research published in the late 1980s and 1990s marked what Sarker et al. (2018a) called the "initiation stage" in the evolution of the first-generation qualitative research. This stage is

characterized by struggles to attain recognition and acceptance by the mainstream IS outlets. Qualitative inquiry was appealing to nonpositivist researchers, as it allowed them to break from the positivist tradition and explore new and innovative modes of researching (e.g., Galliers, 1991; Walsham, 1993, 1995a, 1995b; Harvey, 1997; Prasad, 1997; Schultze, 2000). However, the widespread lack of understanding and not always covert repudiation of nonpositivist qualitative research inhibited its acceptance and legitimation. Qualitative IS researchers took various moves and pursued developments to make qualitative research more acceptable to the mainstream IS audience. One direction was the appropriation of the positivist approach to conduct qualitative case studies (Lee, 1989), thus making it scientific. Other major directions included the promotion of interpretivist research (Walsham, 1993, 1995a, 1995b), grounded theory methodology (Myers, 1997; Urquhart, 1997), critical social research (Ngwenyama & Lee, 1997) and action research (Checkland, 1991; Jonssons, 1991; Kock, McQueen, & Scott, 1997;). These developments marked the contagion stage (Sarker et al., 2018a), signaling increased recognition and legitimacy of qualitative research. The interest in qualitative research grew as IS researchers discovered new opportunities and learned to examine increasingly complex IS phenomena in situ: ISD processes and methods, IS implementation, DSS and GDSS, ERP systems, and, more broadly, the relationship between IS and organizations.

During the 1990s, qualitative IS researchers adopted a range of metatheoretical positions. Similar to management and organization studies, the term qualitative research acquired an “omnibus” meaning (Prasad & Prasad, 2002) referring to the nonquantitative (nonstatistical) nature of data and modes of analysis and inductive theorizing. This implies that both positivist and nonpositivist approaches were seen as equally appropriate for qualitative study (Myers & Avison, 2011). As such, qualitative inquiry became pacified and disciplined in the IS research outlets. This was evident in the increasing emphasis on methods of data collection and data analysis, indicating the emergence of what Sarker et al. (2018a) called the *control stage*. The focus shifted to the “rigor” of research methods as the measure of quality of qualitative empirical studies. Despite considerable differences among, for instance, a positivist qualitative case study and an interpretivist case study, reviewers/editors started to put equal emphasis on the “rigor” of data analysis methods or techniques. Such a tendency of ignoring metatheoretical assumptions underlying qualitative empirical studies, while imposing unifying criteria of methodological rigor across different types of inquiry, brought a sense of *déjà vu*: scientism and conservatism crept up not only on IS but on more

broadly social science qualitative research as well (Tracy, 2010). The control stage was characterized by confusion about the proper foundation and way of conducting qualitative studies, as well as criteria for assessing their quality. When submitting their papers to mainstream journals, qualitative researchers often experienced a mismatch between methodological expectations and related quality criteria applied by reviewers, editors, and the genre of their papers (along with the associated assumptions) (Sarker et al., 2018a, 2018b). Worryingly, qualitative researchers themselves were intolerant of other researchers’ approaches and ways of doing empirical research—what Markus (1997) pointedly named a “simple prejudice.”

This situation had negative, unintended consequences for the adoption of qualitative research. It thus prompted methodological debates among qualitative researchers, leading to important publications that defined specific genres and proposed principles for conducting and evaluating distinct qualitative research genres (Sarker, Xiao, & Beaulieu, 2013; Sarker et al., 2018a). The landmark paper by Klein and Myers (1999) defined seven principles for conducting and evaluating interpretive field studies in information systems. The principle of the hermeneutic circle—the idea that we understand a whole based on our understanding of its parts, which in turn leads to renewed understanding of the parts and so on—is foundational to interpretivist inquiry. This principle thus serves as a basis for all other principles: the principle of contextualization, the principle of interaction between the researcher and the subjects, the principle of abstraction and generalization, the principle of dialogical reasoning, and the principle of multiple interpretations. These principles, as the authors emphasize, cannot be applied in isolation but are instead mutually interrelated. When applied thoughtfully, responsibly, and reflectively, exercising judgment, the principles present an important methodological advancement, helping interpretive researchers develop interesting, plausible, and convincing accounts. Together with earlier publications by Walsham (1993, 1995a, 1995b, 1996) that defined and promoted key examples of interpretivist research, Klein and Myers’s (1999) principles made an important and lasting contribution to understanding, conducting, and evaluating interpretive field study research in IS.

While positivist case study guidelines and standards have been published earlier (in the IS: Benbasat et al., 1987; Lee, 1989; and in other disciplines: Eisenhardt, 1989; Yin, 1984), Dubé and Paré (2003) found that rigor in case study research in IS outlets was lacking. Based on the review of case study publications in seven IS journals from 1990-1999, they found that a large percentage of published case study articles either

ignored or applied the standards only partially. Arguing for the necessity of advancing the rigor of positivist case study methodology Dubé and Paré (2003) proposed additional recommendations for (1) design issues, (2) data collection, and (3) data analysis.

For critical IS research, the qualitative research genre that is least understood and has struggled most for legitimation, the publication of the set of principles by Myers and Klein (2011) made another landmark contribution. While there were attempts to argue that critical research methodology is the defining feature of critical social research (see, e.g., Cecez-Kecmanovic, 2001, 2011), it was Myers and Klein's (2011) paper that established critical social research as a legitimate genre in IS. Drawing from Alvesson and Deetz's (2000) book *Critical Management Studies*, Myers and Klein adopted *critique* and *transformative redefinition* as the key elements that distinguish critical research. They provided a theoretical framework for critical research and proposed six principles (three for each element) for conducting and evaluating critical social IS research: the principle of using core concepts from critical social theorists, the principle of taking a value position, the principle of revealing and challenging prevailing beliefs and social practices, the principle of individual emancipation, the principle of improvements in society, and the principle of improvements in social theories (Myers & Klein, 2011). While critical researchers often apply interpretivist methods (such as ethnography) they do so in a distinctly critical way: by clearly and explicitly articulating values and ethical positions that motivate and drive their research projects (principle 2).

Parallel to the above methodological developments grounded theory methodology has been promoted and increasingly adopted (Orlikowski, 1993; Urquhart, 1997). Grounded theory methodology has been particularly successful in building theory inductively based on empirical data of any kind, using systematic and documented data collection and analysis processes. Since it was first proposed by Glaser and Strauss (1967), grounded theory development was affected by disputes and disagreements regarding the approach and procedure for conducting grounded theory studies (Strauss & Corbin, 1990; Glaser, 1992). While these have been reflected in the application of grounded theory in IS, it has been argued (Glaser, 1992) that grounded theory should be paradigmatically neutral (see Urquhart et al., 2010; Urquhart and Fernandez, 2013). To address this issue and to counter attempts to reduce grounded theory to a coding technique, Urquhart, Lehmann, and Myers (2010) proposed guidelines for conducting and evaluating grounded theory in IS. They illustrated how the application of grounded theory as a systematic method of data collection and analysis is underpinned by different metatheoretical assumptions. In this sense,

grounded theory can be seen as flexible and compatible with other genres of qualitative research (Birks et al., 2013).

Furthermore, the distinct genre of action research has emerged and attracted researchers in the broad domain of social sciences, including IS. The origins of action research (AR) are usually traced to the work of Kurt Lewin (1947a, 1947b) and researchers at the Tavistock Clinic (Trist & Bamforth, 1951). As a methodology, AR has been applied in a plethora of disciplines covering the social sciences, education, health care and business. In each of these disciplines, the method has evolved orthogonally: as a result, AR has emerged in different directions, with a huge diversity of followers and practitioners but without centripetal force that could draw together the various threads. Within the IS discipline, Baskerville and Wood-Harper (1998) documented some ten forms of AR. In the first two decades of the 21st century, some six new forms of AR have been developed. Just as AR has diversified at the macrocosmic level across disciplines, it has also diversified at the microcosmic level within IS. However, some of the 16 forms that used to be popular have now long fallen into desuetude, at least within IS. Others are evidenced by one or two recent examples with no further attempt made to consolidate. In response to such developments and also motivated by increasing interest in the canonical form of AR (first conceptualized by Susman and Evered, 1978), Davison, Martinsons, and Kock (2004) proposed principles for conducting and assessing canonical action research that made a considerable impact on the practice of AR. This was extended by the debate and a systematic investigation of the role of theory in the canonical AR in Davison, Martinsons, and Ou (2012). Additional examples of more widely practiced forms of AR include collaborative practice research (Mathiassen, 2002); and, most recently, the form that aligns itself with design science, i.e., action design research (Sein et al., 2011).

The overall methodological developments across different genres of qualitative research—which are increasingly appropriated in IS research and manifested, for example, by the genre-specific guidelines for conducting empirical studies of specific genres—have contributed to the sophistication and increased quality of qualitative research publications. As Sarker et al. (2018a) points out, since the beginning of the 21st century, first-generation qualitative research has shown some signs of maturation, despite being limited to certain research subcommunities. An important sign of maturation was the “recognition that each genre (or established subgenre) carries a certain set of underlying philosophical and methodological assumptions, and consequently, specific guidelines, criteria, and references, which, when acknowledged by

authors, provide an internal consistency to the study” (p. 755).

It is important to mention here that one such subcommunity has grown around the IFIP Working Group (WG) 8.2 that played a distinct role in advancing and maturing qualitative inquiry as a reformist movement since the 1984 Manchester Working Conference, mentioned above. IFIP WG 8.2 working conferences that followed trialed new interpretive modes of inquiry and established the *interpretive turn* in IS qualitative research. It was no surprise then that the 2016 Dublin IFIP WG 8.2 conference “Beyond Interpretivism? New Encounters with Technology and Organisation” (Introna et al., 2016) invited and inspired scholars to venture beyond interpretivism and explore novel perspectives enabling new research encounters with technology and organizing. To achieve this, IS scholars envisaged, proposed, and adopted new metatheoretical foundations for conducting IS research, such as process philosophy and ontology of becoming, practice theory, performativity, posthumanism and sociomateriality. Thus, the Dublin IFIP WG 8.2 conference inaugurated what we believe can justifiably be called the second generation of qualitative research.

Building on these foundations, the 2018 San Francisco IFIP WG 8.2 working conference “Living with Monsters? Social Implications of Algorithmic Phenomena, Hybrid Agency and the Performativity of Technology” further advanced and demonstrated the fruitfulness of processual, performative, and relational perspectives in inquiring and understanding agency and materiality of algorithmic phenomena (Schultze et al., 2018). Continuing in the spirit of the Dublin conference, the “Living with Monsters” conference established another important milestone in expanding the horizon of qualitative inquiry and enhancing its capacity to engage with the most pressing IS phenomena of our time. By exploring the monster metaphor, the conference expounded the ambivalence of modern technologies (based on algorithms, big data and artificial intelligence) as our creations, drawing attention to the dangers of abandoning them and failing to take responsibility for their consequences. The conference and the published volume pushed the boundaries of IS research, suggesting that qualitative inquiry has matured in important ways: the papers demonstrated the capacity to explore the fast-paced, complex, and uncertain digitization of all domains of life and its unintended social consequences; they adopted novel theoretical perspectives and methodological approaches to study the entangled human/social/technological (material) phenomena (“the monsters of our day”); and, perhaps most critically, the conference and the papers advanced the agenda and stimulated reflection on our roles and moral responsibilities as researchers and creators of

technologies and the ways they (we) perform our digital societies. In the words of the editors:

What the papers in this volume are telling us is that a life in which people and technologies are increasingly entangled and intertwined, is an ongoing journey that will require continuing conscious and critical engagement with, and care for, the creatures/monsters we have created. Only in this way can we live up to our responsibilities as participants in, as well as creators and researchers of, the new ecosystems that constitute our contemporary social worlds (Aanestad et al., 2018, p. 11).

The brief discussion above reviewed and reflected on the maturing of qualitative research in IS. However, this has not led to its broad acceptance and equitable position in the mainstream IS community. While qualitative IS research has received recognition and acquired legitimacy, the numbers of qualitative research papers published in the top IS journals are still disproportionately low (Chen & Hirschheim, 2004; Conboy, Fitzgerald, & Mathiassen, 2012; Avison, Davison, & Malaurent, 2018). This situation is worrying for qualitative researchers but also, and even more so, for the IS discipline and its relevance. Questions regarding research approaches and related methodologies are becoming ever more critical and urgent in the era of widespread digitization and automation. While the digital transformation of all domains of human endeavor is accelerating, IS phenomena are becoming increasingly complex, ill-defined, dynamic, and socially consequential. IS researchers are thus challenged to expand and advance their research apparatuses in order to competently and ethically engage with and examine these emerging phenomena without being constrained by historically privileged approaches and methodological choices. While these challenges apply to all IS researchers, in the next section we discuss specific challenges faced by qualitative researchers.

4 Methodological Challenges of Qualitative Research in IS

Qualitative IS researchers face numerous and distinct methodological challenges as they seek to engage with, immerse themselves in, understand, and theorize the phenomena that are emerging within the new ways of working, organizing, and living in our digital world. In exploring new ways of conceiving and conducting qualitative inquiry, qualitative IS researchers stand at the forefront of methodological challenges, compelled to develop advancements that enable new knowledge creation and a better understanding of digital phenomena. In this section, we reflect on some major

methodological challenges emerging across the spectrum of qualitative research genres and, when appropriate, we refer to the ways the papers published in this special issue have dealt with these challenges and contributed to methodological advancements.

4.1 Challenges of Broadening Research Approaches and Adopting/Developing Novel Methodologies

The distinct advantages of qualitative inquiry, emphasized in the literature, are the creation of new insights, the discovery of new phenomena, and the building of new theoretical accounts of complex and wicked problems (Bansal et al., 2018; Bansal & Corley, 2011; Sarker et al., 2018a, 2018b). As discussed above, the landscape of qualitative research in IS and other social sciences includes a wide range of genres (research methodologies and related methods) unrestricted by ontological and epistemological assumptions. Such richness is celebrated but not necessarily embraced in research practice and publications. Qualitative researchers across the social sciences (with IS not being an exception) tend to narrow their methodological choices by adopting positivist approaches and related genres (such as positivist case studies) (see, e.g., Dubé & Paré, 2003; Sarker et al., 2018a, 2018b), thus limiting the possibilities for rich insights and discovery (Bansal et al., 2018). There is broad agreement among qualitative researchers that broadening onto-epistemological assumptions and adopting a wide breadth of approaches are critical for the advancement of qualitative inquiry (Bansal et al., 2018; Sarker et al., 2018a, 2018b). We would also add that such broadening of metatheoretical positions is fundamental to achieving the distinct quality of qualitative research as a mode of discovery that implies new ways of seeing, studying, and theorizing.

The question of metatheoretical diversity is particularly puzzling for qualitative IS researchers. Facing increasingly complex, fluid and uncertain phenomena in the digital world has challenged qualitative researchers' established worldviews, their well-rehearsed and trusted research methods, and their comfort zones. These are important motivations for qualitative IS scholars to seek and explore new research approaches and alternative research methods. As demonstrated by the recent IFIP WG 8.2 conferences, the debates, while still emerging, have grown beyond the opposition between positivism and interpretivism and the confines of Burrell and Morgan's (1979) paradigm model (see Introna et al., 2016; Schultze et al., 2018). Articles in these volumes provide theoretical and empirical arguments for broadening metatheoretical foundations that demonstrate new insights and ways of seeing, achieved through adopting, for instance, practice theory, critical

realism, agential realism and sociomateriality, and performative, posthumanist, and processual perspectives, to name a few.

The challenges of increasing the diversity in qualitative research were among the driving motivations for this special issue. The four papers in the special issue exemplify diversity, each expanding qualitative inquiry in different directions. To illustrate, we discuss two of the papers here and show how they engage with novel metatheoretical foundations that allow them to propose distinct methodological advancements and thus expand the diversity of qualitative research.

As noted above, the first paper in the special issue, "Building an Apparatus: Refractive, Reflective and Diffractive Readings of Trace Data" by Crowston, Oesterlund, and Jackson, advances sociomaterial scholarship and, in particular, its methodology. The key challenge in the adoption of the sociomaterial approach based on agential realism (Barad, 2003, 2007; Orlikowski, 2007) in empirical studies has been the lack of a distinct methodology that shares the same onto-epistemological assumptions (Cecez-Kecmanovic et al., 2014). How to empirically study phenomena that are not given but performed through relations, is puzzling. How to study the social and the material, which are assumed to be ontologically inseparable, is unclear. This paper addresses these particular issues.

Drawing on three metaphors *refraction*, *reflection*, and *diffraction*—introduced by Haraway (1997) and extended by Barad (2007)—the authors provide a new explanation of fundamental ontological and epistemological distinctions among positivist, interpretivist, and sociomaterial approaches (research stream 1, 2, and 3 respectively, as discussed by Orlikowski and Scott, 2008). They show that a *refractive* methodology (positivist) assumes that data (in their case trace data) provide direct access to reality—that is, to pre-given objects with clear boundaries and properties. They then demonstrate that a *reflective* methodology (interpretivist) assumes that data mirror or reflect (given) objects and actions, albeit imperfectly and with distortions, and thus require interpretation. Finally, they describe how a *diffractive* methodology (sociomaterial) assumes that data (including trace data) are not given, but created through an *apparatus* that is entwined with a studied phenomenon. The diffractive methodology thus focuses on the apparatus (e.g., a research instrument, digital platform, or an information system that generates data) and its entanglement with a phenomenon that it performs. It is the apparatus that enacts boundaries and distinctions of and within a phenomenon (performing what Barad [2003] calls agential cuts). Thus, when the apparatus changes, the phenomenon changes too as different agential cuts are

performed. This explains how, at any point in time, an observed phenomenon (its entities and their properties) seems demarcated (has distinct boundaries and properties) and articulates how such demarcations change.

The third paper in the special issue, “Recent Advances and Opportunities for Improving Critical Realism-Based Case Study Research in IS” by Wynn and Williams, makes an important contribution to the discourse on case study methodology. The authors address the limitations of the dominant positivist script in IS case study research (Dubé & Paré, 2003) by expanding its theoretical horizon. They advance critical realism-based case study methodology that enables the exploration of complex and relevant IS phenomena in fundamentally new ways (Zachariadis, Scott, & Barrett et al., 2013; Burton-Jones & Volkoff, 2017).

Critical realism, the authors remind us, is a philosophy that assumes an objective reality that exists independently of our ability to perceive it and also espouses epistemological “relativism,” assuming that knowledge is historically emergent and political (cf. Bhaskar, 1975; Bhaskar & Hartwig, 2010). Its distinct, stratified view of reality identifies three nested domains: the real (e.g., sociotechnical systems involving both human/social structures and technological platforms and networks in a broader social environment); the actual (including events resulting from the enactment and interaction of mechanisms from the real domain); and the empirical (a subset of events in the actual domain that may be perceived and experienced). Seeking to investigate such stratified and complex reality, empirical studies founded on critical realism have often chosen case study methodology because it aligns with the intense nature of such studies and offers an opportunity for in-depth explorations (Williams & Karahanna, 2013; Bygstad, Munkvold, & Volkoff, 2016; Burton-Jones & Volkoff, 2017).

As the authors argue, the challenges of CR-based case studies include exploring and identifying the underlying structures and generative mechanisms that lie beneath the surface (in the real domain) and exploring how they are enacted in particular spatial, temporal, and social conditions so as to cause the events we perceive as constitutive of observed IS phenomena (in the empirical domain). By addressing these challenges, Wynn and Williams’s paper contributes to the methodological advancement of CR-based case studies. Based on their insightful literature review, the authors propose nine methodological recommendations for conducting CR-based case studies. The recommendations provide guidance for conducting CR-based case study research that will assist qualitative researchers in applying critical realism and developing more innovative and

substantive IS theories. These recommendations emphasize two major aspects of CR-based studies. First, the distinct ontological foundation of critical realism should be fully embraced and reflected in a methodological focus on structural components, mechanisms, and the causal logic that explains IS phenomena (observed events). Second, each CR-based study should be perceived as a learning opportunity to enhance the understanding of the fundamental principles of the critical realist approach and to advance the execution of CR studies.

These two papers both demonstrate how engagement with a novel metatheoretical position (Barad’s agential realism and Baskar’s critical realism, respectively) enables methodological advancements that expand the diversity of qualitative studies. Both papers invite scholars to think differently, reconsider their meta-theoretical and categorical frameworks, explore methodological enhancements, and develop a critical toolbox in order to be better equipped to study our increasingly complex and uncertain digital worlds.

4.2 Challenges Arising with the Expansion of Sources and Forms of Data

What is considered “data” in qualitative research is changing. Qualitative research has traditionally involved data collected intentionally to study a particular phenomenon—such as ethnographic observations, interviews, documents, surveys, pictures, and occasionally video recordings of research sites—as part of purposively designed qualitative inquiry. The first and fourth papers in this special issue address how the increasing availability of new types of data called digital trace data—which are generated routinely as part of digital platform operations and the provision of digital services—has begun to attract the attention of qualitative researchers. Digital trace data are becoming ubiquitous: they include transaction logs, social media records, institutional and public interaction records, web search data, blogs and Internet fora, Internet archives, conversation transcripts, digitized historical texts/archives, and many more forms of data. Trace data are heterogeneous, consisting of various forms of text, structured data, pictures, and audiovisual records. As records or byproducts of specific activities and processes, digital trace data present new opportunities and challenges to study these activities and processes as they emerge, at both macro- and microlevels (Berente et al., 2019; Howison, Wiggins, & Crowston, 2011).

The most obvious challenge for qualitative researchers when investigating digital trace data is the enormous size of datasets that can comprise millions of data points, which, as both paper 1 and paper 4 emphasize, make the application of qualitative research methods

simply unfeasible. Therefore, a number of computational tools and statistical techniques have been combined with manual coding and other qualitative techniques to process and make sense of trace data and to draw insights and support inductive theory building (Whelan et al., 2016; Berente et al., 2019).

The fourth paper in the special issue, “Developing Theory Through Integrating Human and Machine Pattern Recognition” by Aron Lindberg, addresses this challenge and proposes the iterative, mutually enhancing deployment of human and machine pattern recognition to support theory development as part of the research framework for abductive inquiry. The framework assumes the central role of human sensemaking, including the human ability to interpret, question, and compare data in a context and derive regularities and insights from the data. Machine pattern recognition, on the other hand, uses the computation of correlations among specified datasets and statistical techniques, such as social network analysis, sequence analysis, or text mining, which are capable of identifying patterns and specific relationships. As humans interpret and make sense of these outcomes (regularities, patterns) to develop the understanding of studied practices/processes, they may ask further questions, suggest other computations (correlations, data mining) and specify propositions (working hypotheses) to be tested based on the datasets. In such a way the “discovery” made by machine pattern recognition or by human beings is followed by “justification” grounded in trace datasets. The process also involves constant comparison with extant theory in order to ultimately build an emergent theory. By drawing from examples of published research studies using digital trace data, Lindberg demonstrates how this abductive inquiry and inductive theory-building method that integrates human and machine pattern recognition extends the qualitative researchers’ capacity to investigate a broader range of data and a wider range of phenomena and enhances researchers’ ability to build theories inductively.

The expansion of sources and forms of data, especially digital trace data, open new and unprecedented possibilities for qualitative researchers. At the same time, this presents new challenges for interpreting and processing data and deriving meaningful insights. Even though we expect the increasing interest in developing and using computational methods and tools to support investigation and data analysis, the problem of understanding data in their specific empirical context continues to persist. We suggest that for future research on digital trace data it is of utmost importance to contextualize digital traces by relating them to the digital context and digital practices in which they are generated. Beyond understanding the meaning of trace data in a context, it is important to understand larger

contextual questions related to datafied individuals and entities and datafied processes in organizations, economy, and society, of which digital traces are byproducts.

4.3 Challenges of Inductive Theory Building

Building theory inductively is a distinguishing feature of qualitative inquiry. In contrast to theory-driven research that privileges a priori theory and its progressive extensions through empirical study, inductive theory building privileges the context in which a phenomenon of interest is situated. Building theory inductively from empirical data enables seeing known phenomena in novel ways and developing innovative theoretical accounts. Importantly, it also enables discovery and theorization of new phenomena. As mentioned earlier, it wasn’t until 1967 when the “The Discovery of Grounded Theory” by Glaser and Strauss was first published that such an approach to theory building was recognized and legitimized in the social sciences. Since then, grounded theory as an approach, methodology, and method of generating theory out of data has been developed in many directions and formats, causing tensions and disputes at times (see, e.g., Glaser, 1992; Strauss & Corbin, 1998; Corley & Gioia, 2004; Charmaz, 2006; Urquhart & Fernandez, 2013; Walsh et al., 2014). As a result, diverse versions and applications of grounded theory have emerged across and within disciplines. Some of the debates were about different philosophical approaches underpinning the application of grounded theory. On the one hand, there were views (mentioned above) that grounded theory as a general methodology/method was not and should not be aligned with any particular philosophical approach and that it could be appropriated using positivism, interpretivism, critical theory, critical realism, or other approaches (Urquhart & Fernandez, 2013; Walsh et al., 2014). On the other hand, Charmaz’s (2006) grounded theory is distinctly constructivist and, as such, well-established and broadly practiced. The challenges of conceiving grounded theory studies informed by different (single or multiple) philosophical approaches and applying grounded theory methodology/method are still open to debate.

More broadly, the developments of inductive theory building have been affected by the debates about the (in)commensurability of paradigms and challenges of theory building within and across paradigms (e.g., Gioia & Pitre, 1990). A number of scholars have questioned the limitations inherent in the adoption of a single paradigm, especially when examining novel, complex, and multifaceted phenomena (Gioia & Pitre, 1990; Mingers, 2001; Cunliff, 2011). There were proposals for a broader approach to inductive theory building that would bridge paradigm boundaries and

consider diverse and inherently irreconcilable theoretical positions in order to generate multiple views on a phenomenon studied (Lewis & Grimes, 1999; Mingers, 2001; Clegg, 2005). Multiparadigm or cross-paradigm inductive theory building, however, poses serious challenges related to juxtaposing, linking, and combining multiple views created within different paradigms that are, by definition, underlined by different and often incompatible assumptions. Even more challenging is the creation of an integrative perspective based on such multiple (paradigmatic) views and the development of a comprehensive theoretical understanding.

These challenges are addressed by the second paper in this special issue, “Pluralist Theory Building: A Methodology for Generalizing, from Data to Theory” by Müller, Mathiassen, and Saunders. The authors acknowledge that the value and feasibility of pluralist research have not been explored in IS. To advance a multiperspective inquiry that enables employment of different paradigms in the process of theory building from data, the authors propose a pluralist theory-building methodology. Assuming rich and multidimensional empirical data the pluralist theory-building methodology integrates the generalization framework by Lee and Baskerville (2003) and Mingers’s (2001) approach to pluralist (multiparadigm) research along two orthogonal dimensions (“single perspective—multiperspective” and “empirical description—theory building”). The process iterates from creating single perspective accounts of empirical descriptions to synthesizing multiperspectival accounts, from which, in turn, theory fragments are created and then synthesized into pluralist theory (generalization process). Importantly, as the authors emphasize, such pluralist theory-building methodology is not easy to implement. In addition to precise methodological steps and the provided guidelines, the application of pluralist theory building requires creativity and imagination to be successful.

The proposed pluralist theory-building methodology presents the latest contribution to the discourse and developments in building theory inductively from empirical data. There are, however, still open questions about the role of empirical data (especially digital trace data) in the process of theorizing, the dynamics of empirical data and theory interplay, and the justification of theoretical claims. These are questions of high importance for the future of IS research as it seeks to advance and sharpen the tools for theory building.

4.4 Challenges of Action Research Advancement

Amid the diversity of the forms of action research, briefly discussed above, its fundamental premises are

largely intact, i.e., that it be collaborative, iterative, and rigorous; that it make contributions to both practice and theory; and that it ameliorate problems experienced by stakeholders, often in organizational contexts (Davison et al. 2004). Further, many of the criticisms that used to be leveled at action research, such as its lack of rigor (Kock et al., 1997) and its tendency to produce either “research with little action or action with little research” (Dickens & Watkins, 1999, p. 131), have long been refuted. While it is fair to say that methodologically, action research has advanced considerably in the last two decades, the question of its methodological challenges and advances is a pertinent one. Indeed, notwithstanding the attention of IS researchers regarding how action research should be undertaken, the method is relatively infrequently encountered in the IS research literature. Avison et al. (2018) explore this situation, debunking myths and demonstrating how barriers to its execution can be overcome.

A critical problem that bedevils the IS action research community is the remarkable propensity of IS researchers to engage in neomethodological creativity, churning out new forms of action research every few years; unfortunately, each new form fails to make a sustained advance, in large part because of the dissipation of focus. Most of the forms are practiced so seldom that they are barely more than flashes of meteors in the night: the cumulative sense of progress is absent. This situation bears comparison with the analogy (Heeks & Bailur, 2007) of randomly tossing rocks into a pond instead of using the same rocks to build cairns of knowledge. For instance, in a recent article, Durcikova, Lee, and Brown (2018) advocate yet another new form of action research, which they term statistical action research, claiming that this is the first instance of positivist action research. Statistical action research owes much to canonical action research, with which it explicitly claims affinity; however, making the unwarranted claim that statistical action research is an entirely new form of action research is implausible. At best, it is an attempt to introduce statistical precision into the existing formula of canonical action research. This is a worthy venture, but we don’t need a completely new form of action research to accomplish it.

If we are to see true methodological advances in action research, then we need to consolidate before we innovate further. We need to bury some of the forms that have outlived their usefulness and nurture a much smaller number, integrating lessons and procedures where possible. We should focus our attention on applying this smaller number of forms, enhancing their rigor and relevance, subjecting their principles and criteria to stringent tests of reliability, and honing their procedures, even as we recognize the emergent nature of action research that defies too formulaic a

straitjacket. This kind of methodological advance is thus one of consolidation and focus, not innovation and diffusion. For instance, Wong and Davison (2018) suggest that canonical action research can be enhanced by inserting a new prediagnostic stage in which the researchers devote considerable effort to learn about the organization, its people and culture, and its language and jargon, in order to ensure that when they do start to interact with employees they are fully cognizant of what they are seeing and hearing.

Achieving these kinds of advances requires a concomitant commitment from both (action) researchers and the editorial boards of our conferences and journals that may be impossible to achieve if we lack common purpose. In practice, there is nothing to stop researchers from developing new forms of a methodology essentially ad nauseam and ad infinitum, so long as they can provide sufficient evidence to convince a review panel. We need, therefore, to develop a sense of community among action researchers. This could be achieved in an AIS SIG, if common agreement can be reached. It could also be achieved in an editorial such as the current one, if it is read and becomes an authoritative source of guidance. Naturally, academic freedom is the eternal rider to any guidance, as it should be.

The three forms of AR that are most commonly practiced today appear to be the canonical, action design and collaborative practice forms. Each of these has distinct objectives and contributions to make. Nevertheless, each one could be enhanced by the inclusion of ideas from other forms of action research—notably, dialogical action research (Martensson & Lee, 2004; Ou Yang et al., 2017), collaborative business engineering (de Vreede, 1997; Hengst & de Vreede, 2004), grounded action research (Baskerville & Pries-Heje, 1997; Rohde et al., 2017), and soft systems (Checkland, 1981; Wang, Liu, & Mingers, 2015). We suggest that in the future, action researchers apply themselves to the enhancement of these three existing forms, as evidenced in practice. When we have a solid foundation of strongly validated action research forms, as well as clear demands from research practice, we can proceed to innovate further.

In this section, we explored some important methodological challenges of qualitative inquiry that are critical to advancing our knowledge and expanding the breadth and variety of approaches, methodologies, and theoretical directions in qualitative IS research. In this context, we discussed distinct contributions that each paper in this special issue makes in advancing qualitative research methodologies and pushing the boundaries of qualitative inquiry.

5 Concluding Remarks

In concluding, we would like to remind ourselves as IS scholars that, being at the epicenter of the digital revolution, we have the opportunity, and indeed the obligation, to lead inquiries into the emerging territories of digital transformations taking place in old and new forms of working and organizing, both locally and globally, in private, public, and third sectors, and, more broadly, in societies at large. These ongoing and accelerating digital transformations challenge IS researchers to adopt the plurality of philosophical positions and develop new, innovative, and imaginative research methodologies and related research methods.

By opening the space for methodological advancements, this special issue is intended to stimulate methodological innovation and the expansion of metatheoretical foundations of qualitative IS research that are vitally important for tackling the most critical and intractable problems of the fast-changing digital world. While this special issue constitutes a small step in this direction, it will, we hope, motivate and inspire IS researchers to embrace theoretical and conceptual variety and experiment with methodologically diverse inquiries that will permit us to chart novel pathways into the exploration and understanding of our brave new digital world.

Reflecting on the aims of the special issue mentioned in the Introduction, we conclude that the efforts of both paper authors and the editors/reviewers have made a significant step toward achieving them. In many respects, this special issue initiated an unconventional forum for a critical reflection and open debate on some important issues in IS research: metatheoretical foundations, epistemological and methodological choices, and implications for knowledge production, theory building, and relevance for practice. Moreover, we fervently hope that this special issue will stimulate further epistemic developments and methodological advances beyond the well-established and rehearsed paths as we confront and deal with the challenges of the digital age.

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Building an Apparatus: Refractive, Reflective, and Diffractive Readings of Trace Data

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Abstract

We propose a set of methodological principles and strategies for the use of trace data, i.e., data capturing performances carried out on or via information systems, often at a fine level of detail. Trace data comes with a number of methodological and theoretical challenges associated with the inseparable nature of the social and material. Drawing on Haraway and Barad's distinctions among refraction, reflection, and diffraction, we compare three approaches to trace data analysis. We argue that a diffractive methodology allows us to explore how trace data are not given but created through the construction of a research apparatus to study trace data. By focusing on the diffractive ways in which traces ripple through an apparatus, it is possible to explore some of the taken-for-granted, invisible dynamics of sociomateriality. Equally important, this approach allows us to describe what distinctions emerge and when, within entwined phenomena in the research process. Empirically, we illustrate the guiding methodological principles and strategies by analyzing trace data from Gravity Spy, a crowdsourced citizen science project on Zooniverse.org. We conclude by suggesting that a diffractive methodology helps us draw together quantitative and qualitative research practices in new and productive ways that allow us to study and design for the entwined and dynamic sociomaterial practices found in contemporary organizations.

Keywords: Sociomaterial, Diffractive Methodology, Citizen Science, Learning, Trace Data

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1 Introduction

Information systems have become pervasive platforms for work and life, capturing data about organizational and everyday practices at a fine level of detail (Abbasi, Sarker, & Chiang, 2016; Chen, Chiang, & Storey, 2012, Zuboff 2019). As they are used, systems capture what has been referred to as digital trace data, defined as “records of activity (trace data) undertaken through an online information system (thus digital). A trace is a mark left as a sign of passage; it is recorded evidence that something has occurred in the past” (Howison, Wiggins, & Crowston, 2011, p. 769). As opposed to other forms of data commonly used in information

systems research (e.g., surveys and interviews, summary data or post hoc reflections), trace data are generated through routine system usage, and thus track events as they unfold over time. In this way, information systems may serve as research apparatuses, instrumenting and capturing data about a wide range of performances. And like all advances in instrumentation, trace data open new areas of study with vast potential for discovery.

At the same time, trace data raise a number of methodological challenges. First, utilizing trace data demands a deeper exploration of not only the social but also the material performances that go into their production. It is impossible to untangle the data from

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