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Cyborg Methodologies: Rewriting the Role of Digital, Social and Mobile Media Technologies in the Production of Knowledge

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The ubiquitous entanglement of digital, social and mobile media – and increasingly generative artificial intelligence – in everyday life is reconstituting us (and our methodologies) as *cyborg*. This paper sets out to explore *how* cyborg methodologies can positively impact research practice and outcomes. In doing so, we reveal the mediating effects of digital technologies, the promissory and performative knowledge they co-produce and the new temporal-spatial ways of seeing this process affords: the generation of new, long chains of data that engender new ways of seeing and knowing *in situ* (in Rocinha) and *at large* (from Northwest England). Using examples from our own *cyborg methodologies* we illustrate how WhatsApp and Facebook acted as a constitutive and transformative digital technology, helping to *(re)frame* the site of inquiry, *(re)assemble* the methodological tools at hand and *(re)form* the knowledge produced in a dynamic process of unfolding understanding in a favela-based market study, in Brazil. Consequently, we argue the need to *(re)write* accounts of research practice, to provide additional transparency of the co-production of knowledge between human researchers and digital technologies and suggest that doing so will empower scholars to perform new realities and promissories, future-oriented imaginaries with the power to enact real-world impact.

Introduction

Cyborg methodologies are transforming the production of knowledge: what we know and how we make sense of our sociomaterial research practice. Haraway (1987) first used the term 'cyborg' to describe the combined cybernetic–biological organism as a way of rethinking and reframing human and technological interactions. For Haraway and Wolfe (2016, p. 7), life is full of 'theorized and fabricated hybrids of machine and organism', which has profound consequences for understanding how subjectivities and knowledge are produced. The very nature of the cyborg suggests that 'the partial and contingent practices of knowledge-in-the-making' (Wilson, 2009, p. 500) afford new insight, influenced by the qualities of personal feelings, tastes or opinions that digital, social and mobile media (DSMM)[1] technologies recursively put into the hands of researchers (cf. Lamberton and Stephen, 2016). For generative artificial intelligence (GAI), such affordances may also hold. As Quattrone *et al.* (2024) point out:

> AI may be useful not to predict the future, but to actually imagine and make it … This is the art in the 'artificial' and points to the possibility of conceiving AI as a compositional art, which helps us to create images of the future, sparks imagination and creativity and, hopefully, offers a space for speculation and reflection. (cited in Brown *et al.*, 2024, p. 6)

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[1]We use the term 'digital, social and mobile media' (DSMM) in keeping with Lamberton and Stephen (2016). We use this term to distinguish the impact of this comparatively new group of technologies that are now being used in research practice, in contrast with analytical software (SPSS, Invivo, etc.) that has been used for much longer.

Nascent conversations in the *British Journal of Management* about the hybridization of research practice (e.g. Alcadipani and Cunliffe, 2023) and related debates about the significance and power of management research in producing meaningful insights (Beech and Anseel, 2020; Budhwar and Cumming, 2020; Sheng *et al.*, 2021), together with advancements in digital technologies such as GAI (Brown *et al.*, 2024), highlight the urgent need to reflect on how we might produce knowledge differently for maximum effect. Yet the affordances of cyborg methodologies and their power to enact change through the knowledge they produce are often obscured. We set out to address this gap.

Digital technologies, including social media platforms, apps, smartphones and their related infrastructures, are deeply entangled with our everyday practices: chatting with friends, reading the news, dating, buying food and tourism experiences (Duffy, Reid and Finch, 2020; Fuentes, Bäckström and Svingstedt, 2017; Roscoe and Chillas, 2014; Talwar *et al.*, 2022). These everyday practices are '[…] always bound with [digital] materialit[ies]' (Orlikowski, 2007, p. 1436) that produce new ways of doing things and new forms of knowing. Pink *et al.* (2018) show how everyday entanglements with mobile media help constitute the textures and feelings of home and work, while Lamberton and Stephen (2016) consider digital technologies as facilitators of individual expression, decision support and market intelligence. While these studies reveal something of the transformative role of digital technologies in the production of knowledge and understanding *outside* of the research domain, few management or marketing researchers explicitly explore the implications of digital technologies for their own research practice. For example, while Ashman *et al.* (2022) mention the use of email surveys and Panhale *et al.* (2022) describe the use of Zoom interviews, both fail to consider the potential effect of the digital tools they employed on the knowledge produced. Even when the object of study *is* digital technologies (e.g. Hine, 2008), the human-centred approach of the researchers renders the technologies passive. Digital technologies are seen as tools dominated and used by researchers in snapshot moments of data collection, as part of a formal, ex-ante research design (Conway, 2014; DeBerry-Spence *et al.*, 2019; Hajli *et al.*, 2021; Hjorth *et al.*, 2017; Sena *et al.*, 2019). The researcher exists *outside* and separate from the digital research technologies. For example, knowledge produced via Zoom interviews is seen as equivalent to face-to-face-interviews, even though, as Lobe *et al.* (2022) show, Zoom participants often require more probing questions, are less spontaneous and are often distracted. Non-verbal communication and social presence also manifest as different data in online environments (see Harvey *et al.*, 2024). Chowdhury *et al.* (2024, p. 1680) explore the impact of GAI on human resource management and propose a roadmap 'to boost operational efficiency, foster innovation and secure a competitive advantage'. Whether the authors engaged with GAI, how and to what effect for the development of their insights is unclear. We argue that by failing to recognize the agency and effects of digital tools on research practice, we are missing opportunities to understand *how* cyborg methodologies can positively impact research practice and outcomes.

In what follows, we first review qualitative methodology sections within the marketing and management literatures, considering how researchers typically frame the mediating effects of the digital technologies they use in their research practice and the performative knowledge they co-produce. Mediating effects are evidenced when the production of knowledge is altered using digital technologies. Performative effects are evidenced where the knowledge produced *with* these technologies, enacts alternative realities that would otherwise have been the case. We compare our observations with those cited in science and technology studies (STS) and geography and use them to propose *cyborg methodologies* as an alternative conceptualization of research practice (cf. Wilson, 2009). Drawing on our own research experience, we illustrate our argument by showing how our use of WhatsApp and Facebook transformed our study of the favela tourism market-making practices in Rocinha, Brazil. We show how cyborg methodologies generated new, long chains of data, engendering new ways of seeing and knowing *in situ* (in Rocinha) and *at large* (from Northwest England). As such, we propose a new approach to conceptualizing and narrating *cyborg methodologies*, focusing attention on the constitutive relationship between technology and human interaction in research practice (cf. Orlikowski, 2007) and the opportunities for researchers to make more use of the affordances and promissory powers of cyborg knowledge in-the-making.

Methodologies: The separation of social and material

While much attention has been paid to 'how humans make sense of and interact with technology in various circumstances', treatments of such are typically human-centred, to the extent that the 'technology vanishes from view' (Orlikowski, 2007, p. 1437). As Yoo *et al.* (2010) point out, technologies more easily vanish from view when they are ubiquitous and omnipresent in everyday life. Seeded at the beginning of the millennium (Yoo *et al.*, 2010), the ubiquity of digital technologies (and specifically DSMM) has, we argue, invisibly reconfigured research practices in ways that have largely gone unnoticed by scholars, while the 'highly visible and dramatic' effects of digital transformation on the world of work continue to attract growing interest (Orlikowski

and Scott, 2023, p. 1). To illustrate our point, we consider how research practices have traditionally been understood and accounted for in the methodology sections of marketing and management journal papers.

Research practice and methodologies: Pre-digital ubiquity

Long before DSMM became part of everyday life, researchers made use of technologies (e.g. laptops, desktops, software) to order, store and analyse data (cf. Lee and Fielding, 1991). At this time, as evidenced by the methodological sections of our scientific papers, marketing and management researchers rarely conceptualized the relationship between research practices and technologies, and when they did, they were seen as distinct and separate domains (see e.g. Newell *et al.*, 2001; Srinivasan *et al.*, 2002; Wolfe *et al.*, 1993). Typically, researchers described their site of inquiry at a snapshot moment in time and their chosen ex-ante research design and methods (e.g. searching, following, enrolling, recording). On occasion, researchers identified their material technologies (e.g. telephone, directory, audio recorder) and wrote up methodological accounts as descriptions of formal, pre-designed assemblages of methods, consistent with the advice of methodological texts (cf. Easterby-Smith *et al.*, 2012; Yin, 1998). The mediating effects of such technologies remain unrecognized and obscure, despite having important implications for the performative effects of the knowledge produced through their use. In this dynamic, while journal papers mobilize citations and/or conceptual or theoretical development, knowledge is rarely able to travel beyond the academic community and impact real-world practice (see Figure 1 for an illustration of this dynamic).

From this purview, technologies are conceptualized as passive tools, temporarily employed by human researchers in episodic encounters, as part of a formal, ex-ante methodological approach. The site of inquiry is conceptualized as localized, temporarily bound, creating a momentary snapshot of action (Figure 1). Baines, Scheucher and Plasser (2001), for example, in their study of US political marketing expertise in Europe, wrote of a two-stage process using exploratory interviews, noting merely that their 'pre-understanding played an important role in the analysis of the interview transcripts' (p. 1104). The reflexive and materially mediated process that often unfolds methods is implicit.

Research practices and methodologies: Post-digital ubiquity

A decade into the millennium, the ubiquity of digital technologies was recognized as transformational for society (Featherstone, 2009) but less has been said of their impact on scholarly work. Accounts of research practice are largely descriptive and unproblematized (see Table 1 and Figure 2), despite new material technologies' (e.g. apps, smartphones, Internet and their underpinning digital infrastructures) increasing entanglement with what researchers actually do. For instance, during the global pandemic, when researchers sought to overcome contact restrictions imposed by emergency COVID-19 regulations, the mediating effects of digital technologies became more apparent. Van Gestel *et al.* (2024) noted that researching 'via [Microsoft] Teams' was due to pandemic conditions. Offices set up at home were continuously being '… transformed into a hybrid playroom and workspace, a kitchen became both an office and a home-schooling centre' (Ashman *et al.*, 2022, p. 1134). Scrutiny of these methodologies raises several questions: How were participants identified and initially engaged in research under global pandemic conditions? How did the altered socio-technical arrangements of that time impact the inclusion or exclusion of participatory groups, their responses or even the way research questions were framed or explained online, in

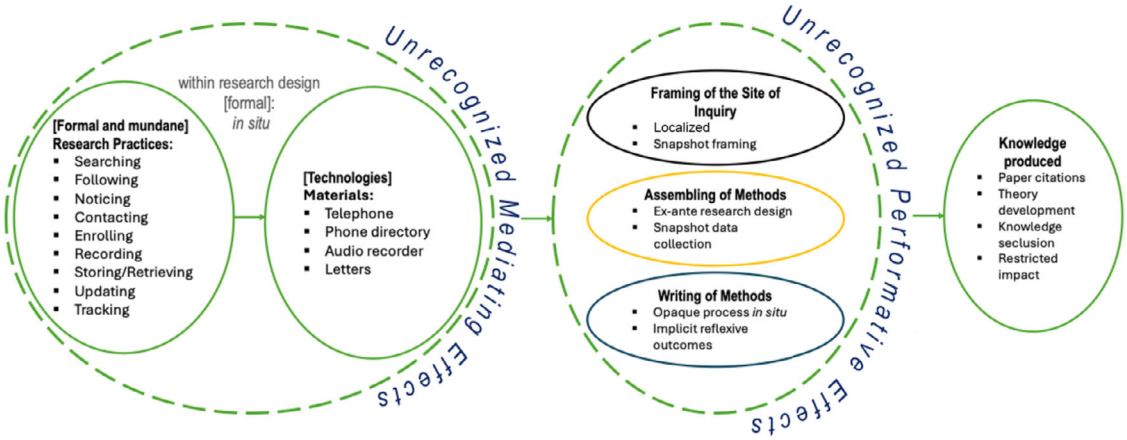

Figure 1. The separation of research practice and technologies pre-digital ubiquity, and the effects of this position

Table 1. Examples of the unrecognized mediating effects of DSMM in research practice and the performativity of the knowledge produce

Reported method	Unrecognized mediating effects	Insights missed by researchers	Unrecognized performative effects of the knowledge produced
Internet survey (e.g. Felker *et al.*, 2023) Interviews and focus groups using Webex and Microsoft Teams (van Gestel *et al.*, 2024) Interviews via Skype or Zoom (e.g. Ashman *et al.*, 2022)	Framing of the site of inquiry: multi-sited data collection, enrolment of participants 'from afar', potential for ongoing learning about the site. Assembling of methods: changes in the dynamic of interaction with participants; speed of data collection and analysis via Webex, for example; potential for ongoing flow of data from participants. Writing of methods: transparent disclosure of the role of DSMM in enabling engaged research and reflexivity that produced insights.	How DSMM enabled the accomplishment of research work and how the process would break and/or look different without them (e.g. accessing people in lockdown). DSMM framed paths to access participants and databases and could enable new paths of inquiry. A more transparent account of the research methodology to inspire new imaginaries and guide other scholars inevitably working with and through DSMM.	Knowledge seclusion: academic work is framed as separate from and safeguarded against digital ubiquity and related effects at scale. Here, knowledge is produced for, and remains largely within, academia. Restricted impact: imaginaries of how DSMM can allow the ongoing co-production of knowledge with non-academic actors are hindered.

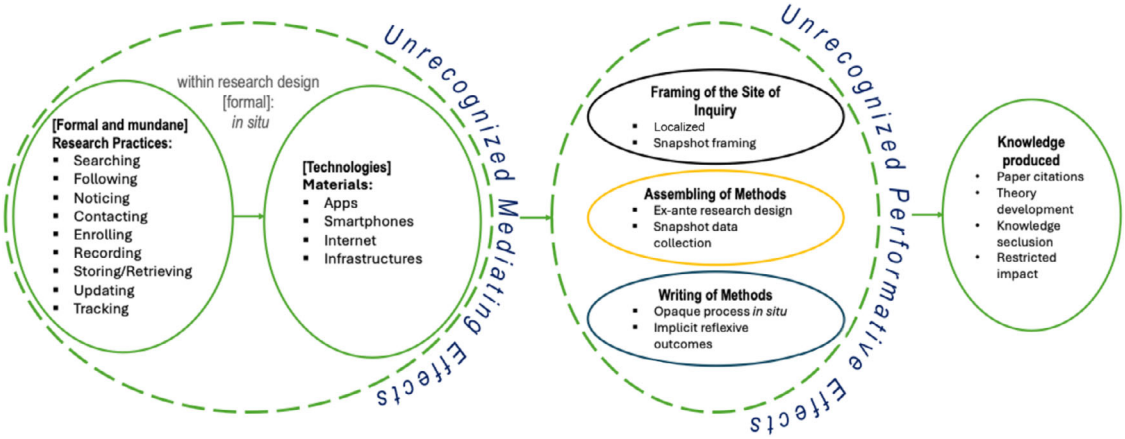

Figure 2. The separation of research practice and technologies post-DSMM ubiquity

the moment? In other words, what were the mediating effects of interviewing via Teams and the consequences of this for the knowledge produced? These questions reveal a blind spot in the way digital technologies are used and reported as methodologies, constituting the effects of technologies as opaque or insignificant to communities grappling with rapid technological change in a fast-changing world. A world where the entanglement of the digital technologies of researchers with those of engaged participants is rife.

The separation of DSMM as a research tool from the phenomenon of study is not straightforward. Some authors make the digitally related phenomena their object of attention (e.g. Cocker and Cronin, 2017; Gandini, 2016; Mardon *et al.*, 2023), others don't (e.g. Anaza *et al.*, 2023; Leek and Afoakwah, 2023; Lindberg and Mossberg, 2022), but for the most part, methodology sections unproblematically describe the digital tools used to organize and analyse data (e.g. Conway, 2014; Hajli *et al.*, 2021; Sena *et al.*, 2019; Sheng *et al.*, 2021). They show a lack of awareness of digital mediation in the production of knowledge and the performative effects of this knowledge (Hammersley, 1990) (see Table 1).

Although not focused on the performativity of written methodologies, Barrett and Orlikowski (2021, p. 468) argue that extant methodological framings ignore 'the digital materializations that condition the possibilities of getting [research] work done'. This is because, as researchers engage with digital technologies, 'they enact changes to their practices that reconfigure their ways of organizing, […] how resources are deployed, and how

[work] is defined and performed' (Karunakaran *et al.*, 2022, p. 171). Thus, our claim is that in writing, extant research methodologies tend to conceptualize digital technologies as being: (a) tools only present for specific formal methodological purposes; (b) subject to researchers' agential power, employed in pre-design; and (c) separate from both research and everyday practices. Digital technologies are *not* understood or recognized to alter the enactment of research practices.

We argue that when a linear research method is designed ex ante, researchers are more likely to write up methodological accounts that render opaque the messy reality of research practices in situ (Jalili Tanha, 2024). This is perhaps not surprising, given guidance published for digital-inflected ethnographers. Netnography, digital ethnography, visual netnography and virtual ethnography (DeBerry-Spence *et al.*, 2019; Hine, 2008; Hjorth *et al.*, 2017; Kozinets, 2015) follow in this tradition, describing the use of contemporary digital platforms, data ordering, sense-making, reporting and narrating of research practice (Belk *et al.*, 2012; Lugosi and Quinton, 2018; Nelson and Otnes, 2005; Reid and Duffy, 2018; Villegas, 2018) in pre-designed research processes. Marketing and management studies are replete with such examples. Methodological accounts citing Kozinets' (2015) netnography method (i.e. digitally mediated ethnography), for example, tend to focus on the use of social media platforms to gather data (cf. Canavan, 2021; Mardon *et al.*, 2023; Rollins *et al.*, 2014; Scha *et al.*, 2009; Thanh and Kirova, 2018) but fail to foreground the mediation of these technologies on the knowledge produced. Ertimur and Coskuner-Balli (2015, p. 45), for example, explain how they tracked 'forums, blogs, newspapers, and trade journals' to observe discussions and gather comments 'generated by different actors within [them]' in their study of the contested US yoga market. Cocker and Cronin (2017) describe how they accessed YouTube videos to collect comments posted for their charisma study. While the digital research practices of tracking, observing, accessing, surveying and interviewing are designed-in and reported in their methodology section, the mediation played by DSMM in the process (e.g. framing of the site of inquiry) is not discussed or acknowledged (Table 1). Figure 2 illustrates how, despite the widening use of digital technologies in research practice post-2010, their conceptualization and justification in scientific publications remain remarkably unchanged.

This static conceptualization of research practice, which fails to recognize how digital technologies mediate research practices, engenders the production of knowledge that, in its performative power (cf. Callon, 2010), is restricted in its impact outside of academia. The potential performative effects of DSMM-mediated research are rarely enacted because the conditions for their enactment are not made felicitous by our scholarly community (cf. Butler, 2010; Palo, Mason and Roscoe, 2020). The norms of writing up methodology sections in papers obscure the scholarly norms in the performance and publication of research; researchers are not able to reorder or rearrange their methodological tools to better explore their unfolding understanding of the research site; and changing understandings of what the research site actually is, as the research progresses, are pushed to one side (cf. Jalili Tanha, 2024). We argue that these extant research practices represent a significant missed opportunity to perform more impactful research. By working to put in place the felicitous conditions for new knowledge enactments, the performative effects of digital technologies used in research practice can be transformational to knowledge production and use (cf. MacKenzie, 2017; Orlikowski, 2007).

As such, we see the performative effects of digital-human research practices as significantly different from the performative effects of digital-human organizational practices (as reported by organization, management and marketing scholars in their 'findings' sections). While the work of Wanda Orlikowski and colleagues has inspired us in working through our argument (Barley and Orlikowski, 2023; Barrett and Orlikowski, 2021; Karunakaran *et al.*, 2022; Orlikowski and Scott, 2021, 2023, 2024; Scott and Orlikowski, 2022; Zhang and Orlikowski, 2022), these studies provide limited methodological problematization of digital hybridization of scholarly work. Without a shared understanding of methodological possibilities and accountabilities, we 'will remain limited at best, and misleading at worst' (Orlikowski and Scott, 2008, p. 466). By reconceptualizing digital technologies as agentic tools of the trade, researchers would render the constitutive relationships between technology and research practice visible and in so doing, reveal the performativity of these digitally mediated methodologies (cf. Law, 2004), opening up new opportunities for real-world impact.

Towards a conceptualization of cyborg methodologies

In keeping with Haraway (1987) and Orlikowski (2007), we see (research) practices and technologies as ontologically and epistemologically inseparable, and this inseparability engenders new practices (also see Latour, 1996; Law, 2004; Orlikowski and Scott, 2023). In a research context, this conceptualization suggests the need for explicit recognition of what we call *cyborg methodologies*. In what follows, we consider their mediating effects for how researchers reflexively *(re)frame* the site of inquiry, *(re)assemble* methods and report on or *(re)write* methodology, as well as their performativity for the impactfulness of research.

The sociomaterial nature of research practices

For geography, organization, STS and feminist scholars, the entanglement of technologies with practice has engendered new ways of doing and being. Their work sheds light on how digital technologies transform the sociomaterial nature of practice. The geographer David Harvey (1990, p. 426) explains how the development of digital technologies generated 'time-space compression' in practice; an acceleration in which practices are shifted, redesigned, erased or created anew. In organization studies, Orlikowski (2007) points out that practices are always bound with, not simply inseparable from, technologies. Similarly, according to STS scholars, not only are technologies and practices interdependent, but they are perpetually in-the-making, in a continuous state of ongoing emergence (Barad, 2003; Latour, 2005; Law, 2004). In feminist studies, Haraway (2003, p. 14) rejects human–machine boundaries as they begin to be 'transgressed' in practice by cyborgs. Haraway's work has influenced human geography (Millner, 2020; Picon and Ratti, 2017; Swyngedouw, 1996), gender studies (Alaimo, 1994; Elwood and Leszczynski, 2018; Schuurman, 2002; Wilson, 2009) and management and organization studies (Leonardi and Treem, 2020; Newlands, 2021; Wamba *et al.*, 2017).

More recently, Orlikowski and Scott (2023, p. 1) conceptualized 'the corollary effects of waves of digitalization, […] the "digital undertow"' and explain how these undertows 'are generating a set of dynamics that are displacing institutional apparatuses'. For the authors, 'the novel digital materializations [manifest] in profoundly different ways and scales, and at different times and places, including materializations involving generative AI, inscrutable machine learning algorithms, cloud-based platforms, and distributed ledgers' (Orlikowski and Scott, 2023, p. 13). Using Barad's (2007) genealogy of changed 'temporal orientation', Orlikowski and Scott (2023, p. 2) suggest that 'our conventional toolkits for studying organizational phenomena are not well equipped for examining such corollary effects of digitalization'. We agree with their concerns about methodological displacements but go further.

We argue that the *digital undertow* of scholarly methods needs urgent attention. More than reflexive experimentation with genealogy (Orlikowski and Scott, 2023), we need to understand, reframe, account for and report on the methods we deploy amidst the digital undertow of DSMM and, most recently, GAI. Our conceptualization of cyborg methodologies is an attempt to address Orlikowski and Scott's (2023) concerns head on by arguing that research practice, methodological writings and cyborg knowledge outputs need to acknowledge the assemblages of research tools that they make use of. We need to put the ontological entanglement of the (human) research practices and the inseparable affordances of the digital technologies they enrol (cf. Barad, 2007; Cooren, 2020) front and centre of our research.

Conceptualizing cyborg methodologies as bundles of sociomaterial research practices

We present *cyborg methodologies* as an alternative onto-epistemological conceptualization of contemporary research practice: as a sociomaterial hybrid of entangled digital technology–human research practice, with the power to generate real-world impact. This is not practice-as-usual with digital technology 'add-ons' (as in Figure 2). Instead, research practices are conceptualized as reconfigured and created *anew*: concordant with Orlikowski and Scott's (2023) conceptualization of the sociomaterial (digital) practices observed within organizations.

In developing our conceptualization of cyborg methodologies (Figure 3), we draw on a stream of research within the organization and management literature known as market studies (cf. Araujo *et al.*, 2010; Geiger *et al.*, 2024; Kjellberg and Helgesson, 2006; Mason *et al.*, 2015; Mason and Spring, 2011). From this purview, concepts and theories are understood to perform reality, as do the practices creating them (Callon, 2007; MacKenzie *et al.*, 2007). In other words, researchers take part in enacting the realities they describe (Callon, 2007; Law and Urry, 2004), as theories change the very 'thing' they try to order and give meaning to. For example, MacKenzie and Millo (2003) show how the creation of a financial theory (represented as a formula) changed its role from supposing a world (by theorizing that something would happen in a certain way) to bringing that world into being as the formula was used in practice and moved through sequences of actions performed by different actors. In this sense, theories act as *promissories*, setting the expectations of those that pick them up and put them to use (MacKenzie, 2006). As such, theories of action are held open to promissory and anticipatory effects and change (cf. Pollock and Williams, 2010; Wender *et al.*, 2014). Similarly, we argue that as one of the keystone actors in theorization, cyborg methodologies actively participate in the enactment of realities through: (a) the way they (re)frame the site of inquiry; (b) the methods they (re)assemble; and (c) the (re)writing of methods they provoke. We use the prefix 're' with framing, assembling and writing to emphasize the iterative and dynamic implications of cyborg methodologies (see Figure 3). Below, we explain each in turn.

(Re)framing the site of inquiry

We argue that cyborg methodologies iteratively and recursively *(re)frame the site of inquiry* by systemati-

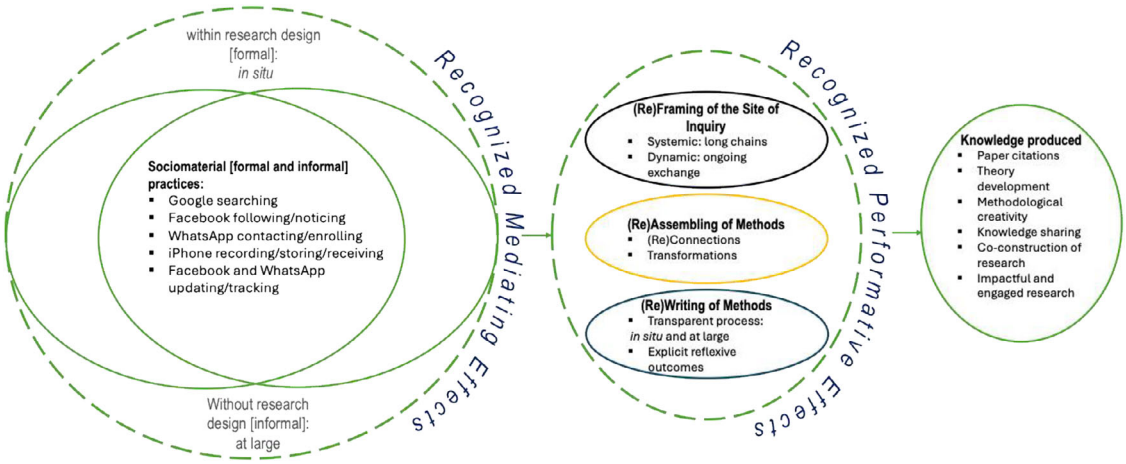

Figure 3. The inseparability of research practices from digital technologies to produce impactful research through cyborg methodologies.

cally and dynamically putting new data, from a multiple and growing number of sources at hand. Each iteration lengthens the chain of knowledge available to the researcher and so strengthens the power of association between actors and their practices (cf. Harvey, 1990). In so doing, the site of inquiry is continually opened up by contestation (i.e. 'am I looking in the right place?') and *re*-search (i.e. 'do I need to look again, in a different place, through the eyes of different actors, or in a different way?'). Researchers are systematically *re*-searching for deeper or different knowledge, meaning and understanding and in doing so, are dynamically generating new versions of the boundaries to the site of inquiry: what needs to be included and paid attention to, and what needs to be excluded and put beyond the study (cf. Scott and Orlikowski, 2025). Understanding continuously unfolds new problems/questions, so that knowledge is always in-the-making (cf. Wilson, 2009), transforming theoretical understanding (cf. MacKenzie and Millo, 2003) and changing the researcher's anticipation of what might be expected to happen next (cf. Pollock and Williams, 2010). This, we argue, creates a dynamic approach to what the researcher considers to be within the frame of the site of inquiry. Concordant with this, Ragin (1992) has long argued that qualitative researchers benefit from iteratively reconceptualizing or 'casing' their site of inquiry in real time, rather than identifying a case ex ante. We argue that cyborg methodologies accelerate and extend such practices (cf. Orlikowski, 2007). Thus, we characterize the *(re)framing* of the site of inquiry as epistemologically distinct from non-digital or DSMM-enrolled research practices, by dint of their ability to produce expansive systematic and dynamic understandings of the research site. The site only becomes settled in its characterization and conceptualization as a site or 'case' of something through the iterative process of analysis and reflection (Ragin, 1992). We argue that this recursive process is different *because* of the sociomaterial practices of cyborg methodologies.

(Re)assembling methods

We argue that cyborg methodologies iteratively and recursively *(re)assemble methods* by creating new connections afforded by the nature of digital technologies, and specifically by DSMM and (we suspect) GAI. For example, connecting news stories with changes in the phenomenon under study. As new connections unfold new and deeper understanding, new forms of inquiry and methods are enrolled to help researchers 'follow the action' (Latour, 2005) even further. Each enactment transforms practice. That is to say, each *re*-assemblage of methods iteratively enrols a widening variety of methods, expanding the assemblage of formal (e.g. semi-structured interviews, documentary analysis) and informal (e.g. WhatsApp chats, informal face-to-face conversations) methods (see e.g. Maitlis, 2005). We find commonalities here with Davide Nicolini's (2009, p. 1391) call for researchers to iteratively 'zoom-in' to focus on the specifics of a particular site of practice, and 'zoom-out' to understand the broader institutional context. This, we argue, directs attention to new sites and aspects of practice in a way that enables researchers to see new connections. While Nicolini's (2009) argument is for using different theoretical lenses to *re*-search at different scales, we argue that the same is true for using different methods: with each iteration requiring the enrolment of appropriate methods to help the researcher better follow the action.

(Re)writing methodologies

In consequence, cyborg methodologies demand *(re)writing methodologies* as unfolding narratives, presented as a staged process of abductive reasoning

(cf. Maitlis, 2005; Mason *et al.*, 2019; Sætre and Van de Ven, 2021). These stages make visible and provide increased transparency to the research practices performed *in situ* and *at large*, in an unfolding process of knowledge production and understanding (cf. Ragin, 1992). By *in situ* we mean research carried out at the site of practice in its most concrete sense – the firm, the city, the market (cf. Mason and Spring, 2011). By *at large* we mean research carried out from a distance, 'at different times and places' (Orlikowski and Scott, 2023, p. 13), in the space where DSMM and other digital ethnographic methods (cf. Hjorth *et al.*, 2017; Kozinets, 2015) help researchers reveal the broader institutional norms and social structures that configure practice (cf. Nicolini, 2009). We recognize that the ubiquity and everyday use of digital technologies can flow into, inform and inspire digital research practices. For example, when reading online news and social media sites for general interest, researchers might be provoked into rethinking their research site, methods or unfolding understanding of such. Therefore, research practices rewritten as cyborg methodologies will not merely describe a research practice but will, because of their performativity, help enact reflexivity of researchers and research participants, opening up new research practice in future (cf. Pollock and Williams, 2010; Roscoe and Loza, 2019). To illustrate our conceptualization, we draw on our own research practices in the study of the favela tourism market in Rocinha, Brazil.

Cyborg methodologies in practice: Researching the making of the favela tourism market in Rocinha, Brazil

Our research practices were performed as part of, what turned out to be, a 6-year marketography[2] (Roscoe and Loza, 2019), studying the efforts of indigenous, resident-entrepreneurs as they worked to make a favela tourism market in the Rocinha favela, Rio de Janeiro, Brazil. Reflections on the research practices described here, gave rise to our conceptualization of *cyborg methodologies*.

Our site of inquiry

Our site of inquiry was originally framed as 'the favela'. Favelas are the urban shantytowns populating cities like Rio de Janeiro and São Paulo in Brazil. Rocinha is the largest favela of Rio de Janeiro, with approximately 70,000 residents (Carneiro, 2023). Rocinha inhabitants work to overcome poverty, social and spatial exclusion through decent work – a significant challenge (cf. Freire-Medeiros, 2011). Rocinha suffers from an unreliable and fractured water and sanitation infrastructure, but access to WiFi is widespread. Consequently, digital technologies, and specifically DSMM, have become a powerful part of local entrepreneurship practice (Fernandes *et al.*, 2019). In an iterative (re)framing of the site of inquiry and by (re)assembling the methods performed as our knowledge unfolded, the impact of our research practices became apparent as the market-making practices of the entrepreneurs we were studying transformed. Table 2 provides illustrative examples of our cyborg methodologies and their effects on Rocinha's favela tourism market. Vignettes 1 and 2 below provide additional detail showing research practice and related analysis.

Vignette 1: How cyborg methodologies (re)framed our site of inquiry and caused us to (re)write our narrative about our research practice

Research practice. We 'followed the action' (Latour, 2005) of indigenous entrepreneurs by enacting cyborg methodologies through our research practices. Having seen favela entrepreneurs on Facebook while messing around with our smartphones one evening, we started to think about studying market-making in favelas. We were intrigued to know how these entrepreneurs were using digital technologies in practice. The exact boundaries of the research were open to discovery as we followed actors online and mapped the market (cf. Roscoe and Loza, 2019) using laptops from our place of employment in Northwest England. We performed new digital practices to produce a detailed map of this informal market. We also used our phones every day to follow friends on Facebook, access news about the favelas and about Brazil more generally.

Google searches led to the *re*-framing of our site of inquiry. We started by trying to understand how entrepreneurs in subsistence markets used technologies, and later we reframed this as indigenous favela tourism market-making; and later, market-making for tours. Keyword combinations (e.g. 'favela+digital') were Googled. A recently developed Facebook initiative in Rio de Janeiro was found: 'free' 1-day courses were being offered to favela-based entrepreneurs wanting to learn how to use this digital platform as a 'business tool'. Courses were delivered in-person, in partnership with and at NGO CUFA's (Central Union of Favelas) headquarters. Facebook community pages and our own Facebook profiles enabled messages back-and-forth with the community administrator and course convenor, giving us the opportunity to explain our intent and access the in-person class. Classes were exclusively for favela entrepreneurs, so this was privileged access. Our Facebook profiles assisted the administrator in checking our identity and establishing trust. Fernan-

[2]Marketography is a specific form of ethnographic research that focuses on understanding the dynamics of markets.

Table 2. Cyborg methodologies in practice

Socio- (human) action	Material (digital) assemblages	Knowledge	Performative effects
Researchers make use of ubiquitous DSMM in their everyday lives, reading the news, following sites of interest on Facebook and other online sites *at large*. Researchers use insights to imagine research projects and suggest possible sites and objects of inquiry, shape Google search and participant enrolment for research projects. Researchers read and are struck by stories online of subsistence markets in Brazil and the government's efforts to 'pacify' favelas (BBC News, 2013).	Online newspapers with regional, national and international reporting. Google search engine, its algorithms, the Internet, laptop, smartphone and Facebook app.	Development of general understanding of gang violence, government 'urban pacification', 'crackdown' initiatives, reports of a tourist being 'shot', access to Internet and WiFi in favelas.	'Casing' favelas as subsistence marketplaces with indigenous entrepreneurs coming up with ingenious ways to make a living by securing decent work (cf. Ragin, 1992).
Researchers identify a specific site of inquiry and potential participants, perform Google searches, update their Facebook profile, generate posts about the research idea on Facebook and search other profiles to access the online Facebook community of favela residents.	Google search engine, its algorithms, the Internet, their laptop, smartphone and the Facebook app.	Discovery of specific market actors including NGO–Facebook partnership. Finding Facebook course convener to learn more. Mutual learning and interest about the research and favela tourism case led to invitation to attend Facebook course.	Altered framing of the research project enabled by timely discovery of a relevant site of inquiry from a distance. Established informal relationship with Facebook course convener before arriving at the site of inquiry. Digitally mediated research design. Following favela entrepreneurs on Facebook became part of researchers' routine and social media usage.
Researchers engage in ongoing digital 'chat' with research participants 'following' and 'commenting' on their Facebook posts and pages. Researchers continue to follow online news sites and follow the Facebook community online after leaving the site.	Facebook Messenger, WhatsApp, algorithms, the Internet, WiFi, laptop, smartphone.	Understanding the transformation of the relationship between favela entrepreneurs and researchers. Creation of long chains of data that iteratively re(framed) the site of inquiry. Combination of informal and formal cyborg methodologies as the researchers performed the research. Reflexive work with favela entrepreneurs to develop their market.	Without DSMM the original research design would have remained unchanged until the site visit. Cyborg methodologies blurred the boundaries between general and participant understandings (of market-making) and (re)framed research insights. Real-time actionable and anticipatory knowledge. Different ways and scales, times and places of performing research. Promissory knowledge for entrepreneur participants generated.

des arranged travel to Rio, attended the course, met and interviewed favela entrepreneurs.

Analysis. While Google is maintained and 'fed' data by human actors (e.g. software engineers, users), 'the [search] result is a constitutive entanglement of the social and the material' (Orlikowski, 2007, p. 1440); the knowledge produced cannot be separated from this sociomaterial arrangement. Our Google searches did not simply find reality 'out there'. Rather, they brought a new reality into being by opening up a new path of inquiry, producing new contacts and enabling us to re-

frame and redesign the next steps of our data collection. If we had not used Google and DSMM to inquire into the favela, we would not have known about the favela Facebook course, the NGO partnership or the indigenous entrepreneurs working to build a tourism market.

We had planned to spend time in the favela and use word-of-mouth to help us find and interview participants. But creating boundaries and setting the project in motion was the product of a chain of cyborg methodology enactments, premised on searching skills, theories, interests, entanglement with Google's and WhatsApp's apps, software engineering and algorithms, and Facebook's project, platform, analytics and market strategy, as well as everyone's Internet, laptops, social media and smartphones.

Facebook Messenger and WhatsApp transformed the relationship between the favela entrepreneurs and us (as researchers) by reframing the boundaries and dynamics of our site of inquiry. For example, during the in-situ data collection in Rocinha, regular Facebook and WhatsApp messages held in place a friendly and supportive relationship with participants. These digital 'chats' created an 'open door' dynamic where both participants and researchers could reach out regularly to each other, without the need for formal, structured interview and observation protocols. Informal communication norms, performed through these ubiquitous apps, meant we were always at hand. WhatsApp and Facebook were a constant presence in all our participants' daily working *and* personal practices, as they were in ours. Checking one's phone could quickly create a workflow, depending on who was sending a message and what the content was. Chat apps generated ongoing information flows, including informal updates about entrepreneurs' businesses and cross-checks on the meaning of favela news items. Chats continued long after formal interviews and observations had concluded, transforming what was initially planned as a 2-month study into a 6-year exchange of knowledge, ideas and data.

DSMM had a transformative effect on our framing of favela entrepreneur interviews. Instead of a fixed-case study boundary and timeline, we generated a hybrid, dynamic form of knowing that enabled us to make sense of long chains of entangled, situated, market-making practices across people, things, space and time (cf. Orlikowski and Scott, 2023). This was an iterative process of (re)discovery and (re)framing, *in situ* (while working in the favela) and *at large* (while working from our laptops in England before and after the trip). Digital-mediated data became important in our ongoing analysis, in anticipating possible future scenarios and using these to frame exploratory discussions with the entrepreneurs.

As we began to write up our findings, we continued to use new information sent to us via WhatsApp and Facebook Messenger and accessed through news: (re)framing our data analysis, interpretations and reflections. Rather than taking a snapshot during the favela visit, cyborg methodologies enrolled us in a continuous process of discovery and unfolding knowing. Cyborg methodologies, as research practice, are not typically disclosed in methodology sections of scholarly publications and contrast with traditional methodological accounts found in marketing and management studies. We suspect that this is because accounts of cyborg methodologies blur the boundaries between informal practices of everyday life and the more formal, skilled research methods that help researchers 'get through' scientific peer review. We argue that they should be used as they reveal *how* sites of inquiry are reframed to include continuously unfolding ways of knowing. Our claim here is that adopting cyborg methodologies is a skill in its own right; one that supports the insightful, reflexive and impactful production of knowledge. Cyborg methodologies create a new kind of knowledge that more easily lends itself to actors anticipating and exploring possible future scenarios (cf. Wender *et al.*, 2014), as we experienced in 'casing' the Rocinha–Facebook partnership (cf. Ragin, 1992).

Vignette 2: How our cyborg methodology (re)assembled our methods and generated real-world impact

Research practice. After initial online searches that led to face-to-face interviews, we learned something of the motivation behind the entrepreneurs' efforts to build an *indigenous favela tourism market*. What entrepreneurs told us changed what we looked for in Google and Google Scholar. In the 1990s, our participants had watched foreign tourists being guided around their favela by tourism agencies from the city. City-based tours made money from the favela but returned nothing. It was this injustice that provoked entrepreneurs to develop their *indigenous favela tours* but taking action only became possible because of the ubiquitous use of digital technologies, specifically DSMM. Using DSMM as part of their everyday lives, to follow the news and chat with friends, together with their learning from the Facebook course, favela entrepreneurs began to see an opportunity: they could use DSMM to transform how the market worked, to keep profits in the favela community. We wanted to watch and, if we could, help this happen – and importantly, the entrepreneurs were very keen that we did so. Having used Google and Facebook to find these entrepreneurs, we now needed to share our knowledge of how markets were made and shaped, as well as step into their world to see how they could use this unfolding understanding. We joined (by their invitation) their Facebook business pages and continuously gathered WhatsApp contacts.

The number of WhatsApp and Facebook contacts grew as we talked to more entrepreneurs about our

market-making theories, which gave some of them ideas of who else to enrol in their market-making efforts. We used snowballing techniques to engage new participants, with entrepreneurs recommending others to join our study (and their market-making efforts). As our favela entrepreneurs themselves were already acting as hybrid cyborgs (cf. Haraway, 1987), the only way we could follow the action was to develop our own cyborg methodologies in relation to their entrepreneurial practices. We followed their work across free website-building platforms, Facebook, online payment and banking services, map and news platforms and others, and we followed their chat (with each other, and with us) on Facebook and WhatsApp. These sociomaterial arrangements enacted the production of their market offer: meeting tourists at the subway station, walking them through the favela alleys, stopping at houses and shops while explaining the history, everyday life and values of those living in favela communities, and joining a family in the favela for a rooftop dinner before returning to the station. This community of entrepreneurs, historically stigmatized and excluded from formal markets (Fernandes *et al.*, 2019), managed to connect, coordinate and communicate the activities of multiple entrepreneurs through digital technologies, despite having no financial resources for marketing. We then used cyborg methodologies to trace the making of their market offer as it was received by tourists (via Facebook and Instagram), scheduled (via Facebook or WhatsApp messages), paid for (via online bank transfer), delivered, recorded (via smartphones) and consumed.

We traced the knowledge produced by these enactments, as it was shared by tourists and other entrepreneurs across wider social media channels via Wi-Fi and other elements of the digital infrastructure: as photographs and text posts on Facebook, Instagram and Tripadvisor. We were able to contrast broadcast media representations (including on the BBC) of favelas as violent places (cf. Freire-Medeiros, 2009, 2011) with social media representations of favelas as exciting and safe places. We followed live chat as tour guides, stall holders and tourists 'chatted' with each other and with visitors, contesting the public understanding of what a favela was, and reconstituting Rocinha as a safe place for indigenous favela tours.

Analysis. Studying and understanding the unfolding dynamics of Rocinha indigenous favela tourism market required us to adopt and to some extent co-create cyborg methodologies with and for our participants. The object of attention – market-making – required methods that resonated with modern global realities that were riddled with ephemeral, multiple, dispersed and mobile concerns (cf. Law, 2004; Orlikowski, 2007). For example, attending Facebook's course session in person kickstarted the snowballing process and serendipitous encounters with favela entrepreneurs. In the Facebook 'classroom' (Participant #3) and in nearby cafés, entrepreneurs would show someone's Facebook profile on their smartphone and say '… you should talk to [X]'. Sometimes entrepreneurs would message our Facebook profile link to a friend, as an introduction. We then sent a Facebook 'friend' request mentioning the entrepreneur who had made the introduction. None of these practices were designed-in ex ante but were adopted in response to the needs and interests of participants in relation to our research aim. We used digital technologies to establish confidence with participants and potential participants, to facilitate in-person meetings and the sharing of WhatsApp numbers. WhatsApp mediated the establishment of informal relations quickly, with text message exchanges confirming meeting locations and times. With each new WhatsApp contact and Facebook 'friend' request, we expanded our network of entrepreneurs. Facebook Messenger mediated and enabled catch-ups with entrepreneurs in an informal and friendly way for years after the most intensive data-collection period. Apps mediated and maintained 'open-door' research–participant relationships, producing a much more dynamic understanding of the market-making practices and generating long chains of action that were more transparent than they otherwise would have been. This was possible, at least in part, because digital technologies could be rapidly reassembled as part of our methodology, to create a fluid flow of data and more iterative analysis and interpretation than could have been anticipated by any single method or methods pre-selected at the outset.

Imagining a path of unfolding research action without digital technologies *is* possible. It would have been feasible, perhaps, to discover the favela tourism market by reading travel magazines, contacting travel agencies or speaking with hoteliers: these would all have been (and indeed are) an important part of our marketography toolbox (cf. Roscoe and Loza, 2019). But it would have been difficult for us to find the favela-based entrepreneurial community in the beginning of their involvement with Facebook's course, and much more difficult for the community to create the market, without making extensive use of DSMM in everyday and working lives. And importantly, it was the dialogic affordances of the digital technologies that opened up opportunities for us to share our understanding of market-making in the abstract (through theory) and specifically, sharing our interpretations of what we understood they were doing in real time. The use of DSMM both shaped the market and forced the continuous reassembling of our methods so that we could keep *re*-searching action as it unfolded in new and unexpected ways.

Conclusion and implications

This paper extends extant understanding of the impact of research by conceptualizing and illustrating the mediating and performative effects of cyborg methodologies. The descriptions of our research practices illustrate how we first discovered, engaged with and 'followed' a growing community of entrepreneurs seeking to make a market for indigenous favela tours in Rocinha. The enactment of our cyborg methodologies brought about real-world change in the indigenous market. Three observations are striking.

First, the ubiquity of digital technologies in everyday life (e.g. scrolling the news, messaging family on our phones) acts to constitute the genesis of a research problem and site of inquiry, tracing its development and resolution through time. We argue that 'mindless' scrolling and surfing afford the opportunity for new associations between things, ideas, places and problems in ways that catalyse new kinds of mission-driven research questions. Apps, through their enactment of algorithm-bound searching practices, not only generated the genesis of our research, they also direct attention to a specific type of problem. This is research made easy as everything is at hand – in the magic of the mobile phone. We quickly traced the genealogy of the problem without moving from the sofa; not that this is in and of itself 'enough'. Rather, such searches have the power to enact quick, persuasive genealogies which provoke further, formal inquiry. Facebook, WhatsApp, Instagram and TikTok have the power to create a unique bounded space from which a problem can be explored backwards through history, in the present and into the future, as researchers seek solutions. The boundaries between informal and formal methods are somewhat unclear, plastic and dynamic.

Thus, rather than acting as a given or stable entity, cyborg methodologies are always *in-the-making* and continuously unfolding, with no serializing or design of research methods ex ante. Rather, the boundaries that 'come to matter' (Barad, 2014, p. 176) are continuously reconfigured through the digitally mediated sociomaterial enactments of researchers, research participants and, in our case, Rocinha's classrooms, cafes and crafts (cf. Scott and Orlikowski, 2025).

In this regard, cyborg methodological accounts represent a 'becoming' that encompasses specific timing, placing and a multiplicity of practices that work together to make visible what is at stake: in our case, the inclusion of excluded peoples in the local and global economy. Informal search practices become reformed research practices because of the long chains of associations they enact, connecting the problematic present (e.g. what can favela residents do to secure decent work?) back through history to its cause and into the future to its potential solutions. Genealogical investigations of this kind trace multiple and varied practices to open up new opportunities for action and impact (cf. Wender et al., 2014).

Second, the digitally mediated genealogies generated by cyborg methodologies uniquely afford analysis and understanding of temporal spatialities at multiple scales. Genealogies equip actors to better imagine appropriate solutions and interventions to the problematic object of attention (in our case, the market). The long chains of relational data generated by cyborg methodologies spread into a spider's web of associations, allowing researchers to 'zoom-in' to understand action *in situ* (within a particular site of action) and *at large* (to understand its relation to broader historical and physical contexts). Generating understanding of what is happening at multiple scales through time and space can help researchers imagine and anticipate alternative possible futures and so inform both theorical and practical solution development. As such, we question conceptualizations of digital technologies, and DSMM in particular, as momentarily employed passive devices (Castelló *et al.*, 2016; Cocker and Cronin, 2017; Felix *et al.*, 2017; Felker *et al.*, 2023; Mardon *et al.*, 2023; Sánchez-Fernández and Jiménez-Castillo, 2021) and argue for an ontological shift in how we conceptualize, (re)frame, (re)assemble and (re)write methods to reflect the epistemological transformation brought about by cyborg methodologies (Figure 3). We see cyborg methodologies as pragmatic, supporting close interactions with participants and their histories, while generating feedback loops to co-create future actions through reflexive, abductive reasoning performed *with* and *for* participants (cf. Cunliffe and Karunanayake, 2013). In our research, reflexivity altered both our research practices *and* favela tourism marketing practices. Thus, we argue, cyborg methodologies are well placed to support generative, impactful research, because of the deeper contextualized insights they afford.

Third, and relatedly, we observe cyborg methodologies as performative. That is, the methods enacted at each stage of the research process constructed the object of attention: the market for indigenous favela tours. It is, we argue, the performativity of cyborg methodologies that demands openness to change and positioning of the very act of researching as an intervention. Scott and Orlikowski (2025, p. 7) draw on the notion of agential realism to argue the pressing need for research into the role of AI in organizational practice:

> … there is a moment of possibility in every process of enacting, even in settings that have had fixed routines with significant institutional status for a long time and regardless of ostensibly powerful influences being in play. Thus, even established practices may be shifted or called into question. Barad (2001, p. 93) emphasizes that "agency is the space of possibilities opened up by the indeterminacies

> entailed in exclusions." In other words, the multiplicity and variability of sociomaterial practices means that they are structuring but not determining; they enable and constrain. Every enactment presents an opportunity, a liminal opening in which it is possible to do things differently. In sum, the performativity of sociomaterial practices offers insight into "ways of responsibly imagining and intervening in the re(con)figurations of power" (Barad, 2001, p. 104).

We invoke the same argument for cyborg methodologies. Figure 4 presents an innovative framework that aims to summarize our performative conceptualization of cyborg methodologies in a way which might guide researcher reflexivity, keeping research design open while knowledge unfolds. It also highlights the affordances of digital technologies and how they enact the co-production of actionable knowledge.

These observations have important implications. They imply that researchers need to develop more programmatic approaches to researching and knowing, to embrace the co-constitutive relationship between digital-human researchers and participants. Making use of digital affordances has the potential to transform the worlds that we research, through the research that we do (cf. MacIntosh *et al.*, 2017), addressing concerns with the relevance of marketing and management studies (Alcadipani and Cunliffe, 2023; Beech and Anseel, 2020; Budhwar and Cumming, 2020; Sheng *et al.*, 2021).

Finally, if we accept that the impactfulness of research is dependent on a plethora of new sociomaterial and digitally mediated formal and informal practices, it follows that we should do more to make such practices visible to researchers, participants and research users. By doing so, we stand to build stronger communities of practice, progressing understanding at pace; an essential requirement in our age of social, environmental and economic crisis (cf. Cunliffe and Pavlovich, 2022). We will also be in a better position to reflect on the black-boxing of AI as the digital undertow continues.

Limitations and future research

This paper foregrounds the transformative effects of digital technologies on research practice and outcomes. While our discussion can be generalized to shed light on other disciplines and cases, our insights derive from cyborg methodologies in the favela. We suspect that the cyborg research practices described here are widespread but how they are used, entangled and constituted across geographically distant and culturally heterogenous places requires further consideration (Miller *et al.*, 2016) so that we can better understand how bespoke methodologies can be most effectively enacted and reported. Our discussion draws on and adds to the work of prominent scholars concerned with the relevance and adequacy of the methodologies in the market studies and management literatures grappling with contemporary digitally mediated phenomena (Alcadipani and Cunliffe, 2023; Cunliffe, 2010; Geiger *et al.*, 2024; Orlikowski, 2007; Orlikowski and Scott, 2008, 2023). However, there is scope to further explore cyborg methodologies to ensure marketing and management scholars are well equipped to engage with increasingly complex and unfolding *grand challenges* and the fast-paced rise of AI

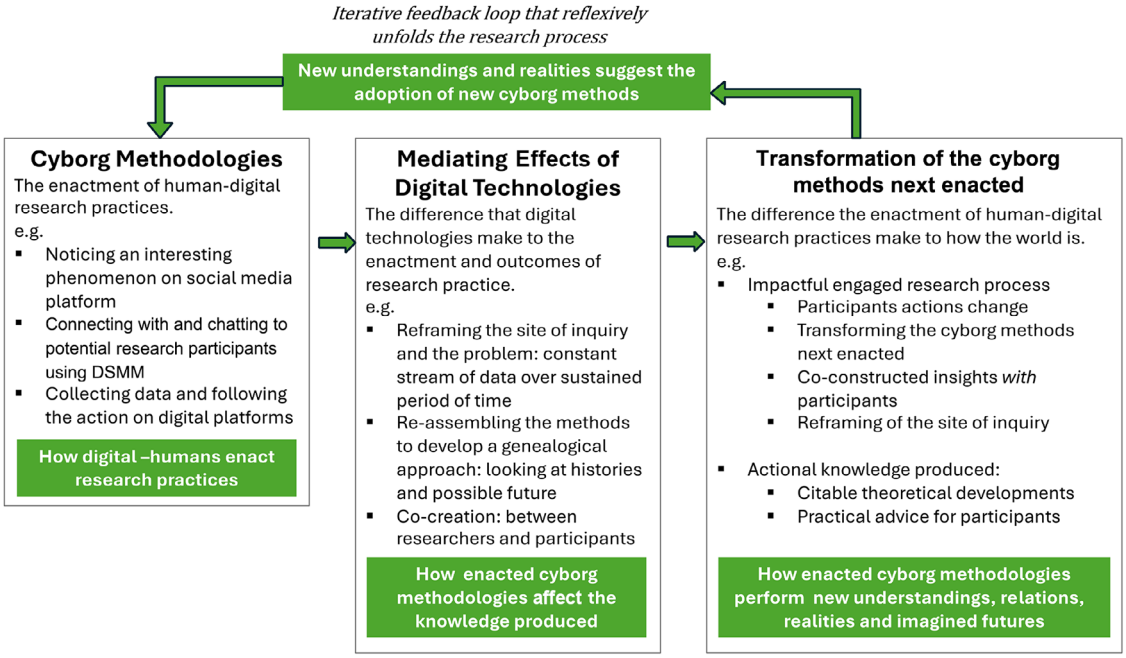

Figure 4. A framework for cyborg methodologies

technologies. Similarly, while the long chains of association generated by cyborg methodologies offer new possibilities for anticipating alternative possible futures (cf. Wender *et al.*, 2014), the generation of useful promissory and anticipatory knowledge is little understood. This is a significant opportunity for further research.

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