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DOI
10.4337/9781800375451.00017

Publication date
2023

Document Version
Final published version

Published in
A Research Agenda for Construction Management

Citation (APA)
Ninan, J., Krishnamurthy, M., & Mahalingam, A. (2023). Making sense of 'new age data sets': researching from afar. In R. Leiringer, & A. Dainty (Eds.), *A Research Agenda for Construction Management* (pp. 243–264). (Elgar Research Agendas). Edward Elgar Publishing. https://doi.org/10.4337/9781800375451.00017

11 Making sense of 'new age data sets': researching from afar

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Introduction

Construction project organisations operate in a complex, uncertain, and interconnected environment that restricts our ability to understand and predict their behaviour (Geraldi, 2008). As Rooke et al. (1997) note, construction processes are carried out by people engaging in concerted social action. These 'people' include managers and engineers working within projects, as well as local communities and project-affected persons acting from without (Tutt & Pink, 2019). Increasingly, construction projects are becoming more complex with the rise of 'megaprojects'. Such large projects involve complex dynamics that bring together a large number and variety of actors: engineers, consultants, owners, users, and other stakeholders. Consequently, an investigation of any phenomenon, such as innovation, safety management, competitiveness, learning process, and so on, in the built environment must involve the study of complex social systems, such as the practices that project participants use, the structures/systems that they inhabit, and/or the dynamics of the active social groups, to name a few (Chan & Raisanen, 2009). Thus, researchers who seek to understand the built environment and improve its practice must perforce study the people who inhabit projects and the interactions between them. In this chapter, we argue for expanding the study of these interactions to the realm of the digital. The construction industry is evolving to embrace digitalisation. Multiple mobile devices, such as smart phones, tablets, and other handheld devices, are prevalent in the construction industry and support communication and collaboration during the construction process (Oesterreich & Teuteberg, 2016). These devices create data every day relating to projects that are currently not explored. We make a case for the constitutive importance of new age data sets, or data compiled from digital interactions in construction

research. In doing so, we also draw upon ongoing work in digital ethnography to argue for its diverse possibilities and increasing validity.

Understanding people in construction presents a unique challenge. The industry itself is a loose constellation of actors, with no defined boundaries, spanning the public and private sectors and technology service providers of a variety of ilks. To understand people in construction, researchers have used different data sources and employed diverse analysis methods from the lexicon of social science research. Arguably, the adaptation of these methods suffers from inattention to the question of the social at the heart of construction management research. As a result, far more attention is focused on a 'business-as-usual' dependence on data writ large at the cost of the complexity of retrieving data in the first place. Data are currently collected through methods such as questionnaires, interviews, or observations. Of these, interviews are the most common data collection instrument used in qualitative research, resulting in Atkinson and Silverman (1997) claiming that we live in an 'interview society'. What such methods often ignore in construction management research is the context-dependent nature of the interview and the stakes for the interviewees in participating. An aspect necessary to qualitative study, participant observation or embodied engagement (Wacquant, 2004) has been paid very little attention in the worlds of project personnel. In a sector such as construction, which is peopled at all levels, the absence of observational data to study people's behaviour is shocking and speaks of a lackadaisical approach to social science methodologies.

As noted by Pink et al. (2010), observations can provide us with insights for addressing the practical, problem-based challenges in the construction setting. Several ethnographies have indeed been reported in this domain (Oswald & Dainty, 2020), involving considerable observation of the social setting at hand, but the nature of what counts as observation or ethnography in this regard is up for debate. Traditional ethnographies involve studying stable communities over long time spans. These time spans allow researchers to observe behaviour and practices to arrive at an understanding of culture within these social settings. In contrast, construction projects are time bound and consist of a constantly changing set of actors, activities, and artefacts as projects progress from design through construction to final commissioning and operation. We therefore see a variety of innovative strategies, such as 'intense' ethnographies (Pink et al., 2010), in the construction sector that blend observational techniques with interviews and other methods of data capture to ostensibly make sense of a continually changing social setting. Nevertheless, such studies represent a minority in the compendium of research on the built environment,

and as Oswald and Dainty (2020) note, suffer from a lack of reflexivity on the part of the researchers.

For construction in the modern digital era, as with several other industries, information regarding the project is created in diverse formats across different media. Social media, news articles, emails, and other digital platforms now comprise a repository of new data that can be observed to study how construction projects behave in the 21st century (Ninan, 2020), and augment our ability to conduct intense ethnographies in rapidly changing settings. In addition, digital work is a critical component of how such projects are executed today, with traditional document-based artefacts, such as blueprints and approvals, being replaced by emails, WhatsApp and other social media platforms, intranet-enabled workflows, and the like. With construction projects moving firmly into the digital age through the use of technologies, such as Building Information Modelling, augmented and virtual reality, and artificial intelligence, data compiled from digital sources, categorised as 'new age data sets' or 'new ways of seeing' (Bansal et al., 2018) can give significant insights on how construction projects are managed and how they can be managed better. Yet these are almost completely ignored, as contemporary ethnographies in construction continue to base themselves on traditional means of collecting qualitative data, such as in-person interviews.

In this chapter, we call for studies using 'new age data sets' as a necessary corrective to the current understanding of ethnographic research in construction research. We argue for new age data sets as both an additional data source as well as an alternative research paradigm to enhance our understanding of an extremely fragmented and complex field. In doing so, we show how current understandings display significant blind spots that can be partly addressed by expanding the realm of the social in project management to the realm of online communication. We also argue that the means of collecting such data is as important as the ends, and that we must pay particular attention to methods to avoid the pitfalls that watered-down ethnographic techniques have encountered in contemporary construction management research.

In the following section, we review the data sets currently employed in construction research and highlight the advantages of new age data sets. Subsequently, we discuss some of these data sets and give examples of how they can be used to understand construction better. Following this, we provide some guidance and implications for data collection and analysis, as well as some gaps in our understanding and pointers for future research.

Data sets

Different data sets are used by researchers to make sense of constructs in social science research. The main classification between these data sets are 'data got up' by the researcher and 'data that are' (Potter, 2002). Some data are manufactured by researchers through their intervention, such as in the case of questionnaires, focus groups, experiments, and interviews, and some data are found in the field by the researcher in the form of naturalistic data, such as in the case of observations (Silverman, 2013). To contrast these two forms of data, Potter (2002) suggests a 'dead social scientist test'; this involves asking: 'Would the data be the same, or be there at all, if the researcher got run over on the way to work? An interview would not take place without the researcher there to ask the questions' (p. 541). To expand on this, we look at how, for understanding the construction sector, researchers need to explore 'what people know' along with 'how they express it', with the latter involving unspoken ways of knowing (Tutt & Pink, 2019), for which naturally occurring or naturalistic data can help. However, what counts as such naturally occurring data has made rapid strides in the current environment.

Current data sources

Data from questionnaires can give us a broad idea of the field; however, they are inefficient for understanding the 'deeply held beliefs' of the sector (Green & Sergeeva, 2019). These questionnaires give very little opportunity for respondents to expand upon their answers or give unprompted opinions (Lupton, 1993). To address these deficiencies with questionnaires, the natural transition was to conduct interviews, as this provided an opportunity for respondents to build upon their answers or offer new insights, which the researcher couldn't embed in their questionnaires. However, interviews too have their inefficiencies, as questions such as 'What is significant?' or 'What do terms mean?' cannot give deep insights on meanings (Emerson et al., 2011) or unveil patterns that were previously unknown. Additionally, the question of bias is not easily handled through interviews, as the response to an interview question can change if the respondent is aware of the research interests (Silverman, 2013). To handle these inefficiencies of 'data got up', researchers moved to explore 'data that are', with the understanding that they need to focus on what people do rather than on reporting accounts of practice that respondents give (Sacks, 1992). If questionnaires help us understand 'what researchers think practitioners do', and interviews point towards 'what practitioners think they do', then observations can help unearth 'what practitioners actually do'.

New age data sets

In this digital era, we argue that 'what practitioners actually do' can best be observed by studying the online environment, given the density of digital communications in contemporary construction projects. For example, internal communications within the projects happen through emails, external communication with the project community happens through social media, and sometimes knowledge is shared through multiple online platforms active in the construction domain. To this extent, the digital becomes not just an additional avenue to explore assumptions, knowledge claims, and attitudes, but indeed an important and constitutive part of the very nature of construction projects. Researchers who observe interactions in these digital environments are therefore well placed to make sense of what practitioners actually do in the built environment. After all, the internet is a 'laboratory for the social sciences', as multiple human interactions occur in these digital habitats (Hallett & Barber, 2014). Happily for researchers, these data do not need to be obtained in real time, as is the case with traditional ethnographic observations. Most of these data are stored digitally, can be retrieved over time, and can therefore supplement any other data gathered by the researcher during the period of physical observation.

This solves another critical problem that qualitative researchers of construction processes face. Construction is an evolving process that unfolds over both time and space, as large construction sites are often geographically distributed. For instance, consider a metro rail 'project' that stretches for several kilometres interspersed with tunnels, stations, and viaducts, each with their own stories. Multiple dramatic events and 'critical incidents' (Flanagan, 1954) need to be studied and documented on such projects. Researchers therefore have to be present where the action occurs to make sense of how knowledge and practices are interwoven through 'doing', which involves people and technologies within a system of social relations (Gherardi & Nicolini, 2002). Similarly, Marshall and Bresnen (2012) note the need to understand how social practices are locally and actively constituted in construction, and highlight challenges of patterning of time and space associated with project activities. Satisfying this necessity to 'be' where the action unfolds places researchers in a delicate situation. In the aforementioned example of the metro rail, should the researchers visit a tunnel where a 'breakthrough' of the tunnel boring machine is imminent? Visit the head office where a critical tender will be opened? Or study the erection of a girder on an elevated viaduct amidst peak-hour traffic on the road below? It is difficult to predict which site is likely to be the ideal one to study a priori, and researchers often risk missing key turns of events; consequently, they are forced to rely on retrospective accounts (sometimes second-hand)

to reconstruct these stories. However, in the digital era, practitioners are spending more time in the digital world, and the 'digital space' is beginning to replace the 'physical space'. Videos, WhatsApp messages, tweets, and the like can help record incidents where researchers are not present, which can then be reviewed by the researcher at a later time. In short, investigating digital data can help short-circuit difficulties related to the inability of researchers to observe multiple spatially distributed incidents at the same time.

One branch of research on digital environments deals with how these environments are creating or shifting cultures of the workplace, in other words, with the anthropology of digital media (Williams, 2018; Spitulnik, 1993). Our focus here, however, is not to study the impact of digital technologies on work practices and cultures, but to understand how such data can represent an additional arrow in the ethnographic data-gatherer's quiver as they attempt to understand social settings better.

Advantages of new age data sets

Observations obtained from the digital environment can capture high-quality data that are generally not available with other instruments. First, 'data got up' by researchers have significant participant biases in them, due either to the questions asked by the researcher, or to the inherent bias of respondents. Similarly, physical observations require the presence of the researcher or the recording instrument, which can hamper the quality of the data collected. Subjects who are aware that they are being observed modify aspects of their behaviour, as seen with the 'Hawthorne effect' (McCarney et al., 2007). Data compiled from online sources are often retrospective, and subjects are not aware of the observation, thereby removing participant bias.

Second, online data sources are digitally indexed and can inform practice longitudinally without any recollection issues with the respondents. The data collected from internet archives can be similar to longitudinal data collected through multiple interviews at different points of time (Sonenshein, 2010), thus informing us about people's changing opinions, concerns, and desires (Eysenbach & Till, 2001), which can be retrieved at any point in time.

Third, gaining access to a construction setting is difficult, and respondents treat researchers as outsiders and do not share valuable information unless researchers establish close relationships with them (Pink et al., 2010). For instance, for one of our data collection efforts, the researcher gained access to data on a rail project only when he gave friendly advice to one of the respondent's sons who wanted to apply to universities in the USA (Mahalingam, 2006).

While access in such serendipitous fashion has long been part of the romance of traditional ethnographic research, it renders the process unpredictable and overly dependent on the social worlds of the researcher. In contrast, new age data sets can be collected through data shared by the construction organisation publicly, or by getting permission from only the top management. New age data sets thus enable an exploration of new avenues that were earlier hidden to researchers due to lack of primary data.

Fourth, respondents are often inconvenienced with data collection methods such as questionnaires and interviews as they have to take time off their work. New age data sets are digital data and can be collected without causing any inconvenience to the respondents.

Finally, respondents can be fearful of sharing too much information during interviews and be at the risk of revealing some confidential data to the researcher. To mitigate this, respondents exercise extreme caution while responding to questions, and this can hamper the data collection effort. In contrast, new age data sets, such as emails, can be screened by the organisation before being handed over to researchers. While this hampers some of the truth-finding goals of research, it allows greater ease vis-à-vis ethical imperatives and helps mitigate risks to respondents. Thus, as Banyard and Hunt (2000) noted, the way in which data are collected has a significant effect on the behaviour of the respondent and the quality of the data, and new age data sets help provide unobstructive and unbiased data.

New age data sets: some examples

New age data sets can be obtained from different sources, such as social media, online news articles, emails, and other digital platforms. We discuss each of them separately below.

Data from social media

The popularity of social media, such as Facebook, Twitter, YouTube, Instagram, and other platforms, is increasing day by day. Many construction projects use social media to engage with the community by operating their own social media page. For instance, in our study of an infrastructure megaproject in India (Ninan et al., 2019), the project team used social media to routinely update the community about, for instance, the progress of the project. The following Twitter entry is an example of this: 'Track work progress as on

18-12-13. Plinth completed for a length of 17719 m on viaduct between *** [station A] and *** [station B]'. Social media can also be used for other purposes, such as marketing and branding (Sivertzen et al., 2013). For example, in our study, we saw that events such as painting competitions for school children that were conducted by the project were popularised within the local community through a series of tweets, such as: 'Painting competition at 4 pm Today!!! Topic – Go Green Metro – Timing 4 pm to 6 pm – Don't forget to bring your colors'.

Such data open up avenues to study new kinds of research questions, for example, how megaprojects strategically conduct community-based events, such as painting competitions on the theme 'go green metro' to paint their sustainability agenda, and get into the hearts and minds (Henisz, 2017) of school children. Researchers can use the natural data from social media to make sense of how a project interacts with different stakeholders via the digital platform. From this new age data, it is possible to study the multiple affordances of social media in projects, and how different stakeholders in the project setting use social media for their own agenda. In addition, such data can provide insights into organisational strategising. In our case, tweets helped us understand how project promoters framed their project to obtain support from the broader stakeholder community. Equally, tweets could also have been used to understand the perspective of stakeholders towards the project as well as the strategic and tactical interventions undertaken by the project team. Such data therefore allow the researcher to 'view' the interactions between actors in detail – project proponents and stakeholders, in this case. It is important here to remember, however, that despite arguments by many as to the fluidity of online and offline lives such that they flow from one to another (Gershon, 2010; Miller, 2013), data from social media must also be supplemented by other forms of qualitative research, such as interviews, to understand the relationship between the two.

Data from online news articles

Construction projects, particularly infrastructure megaprojects, attract a lot of media attention due to their colossal and controversial nature (Frick, 2008). Modern construction projects recognise the importance of the media in shaping the perception of the project, and have a media strategy with dedicated officers handling public relations and interactions with the media (Van Marrewijk et al., 2008). In one of the cases we studied (Ninan et al., 2020), the following quote from a project participant was not obtained through an interview, but was found as a spokesperson's quote in the media: 'Once fully operational, the total capacity of rooftops and ground mounted power systems

in [metro rail organisation's] facilities will be six MW [megawatts], which will make it one of the largest on-site solar projects in India'.

As seen from the instance above, projects market their achievements through the wide reach of the news media. Here, the project highlighted its salient features and promoted these as innovative, community-centric, pioneering, and so on. Along with such positive news of the project, negative news, such as accidents, delays, corruption, and other events, can also be reported in these news mediums, and are often swiftly countered by project participants on similar fora. In the event of an accident on site, the project spokesperson reported in the media, 'The workers did wear their safety gear and other safety precautions were in place. We [metro rail organisation] are in the process of finding out how it happened'.

Analysing data available on digital media can therefore help researchers understand a project's strategic response to externalities. In addition, researchers can study news media to understand the media strategy of construction projects and how projects organise themselves towards the media. Along with the promoters of the project, project protestors also use news media to shape the narratives surrounding the project (Ninan & Sergeeva, 2021). Researchers can use this new age data set to make sense of the media strategy and the role of media in shaping the projects we see today. Usage of this data set is also crucial, keeping in mind a key aspect of the sociality of construction projects in that their reputation is constitutive of their capability to forge forward. Managing public perceptions therefore becomes paramount as one of the key aspects of project management.

Articles in the news media have long been used as a secondary data source in qualitative research to supplement direct observations and interview data. However, digital media has evolved beyond the digitisation of print media and includes blogs, online-only news outlets, and the like, leading to a potentially rich data set for researchers to access. Indeed, one can consider upgrading the status of such media data to 'primary' data sources that can be mined, as compared to their current status as 'secondary data'. After all, it is what researchers do with the data that determines whether the data are primary or secondary (Speer, 2002). This may be of particular resonance to construction projects, given the capacity of digital media to record responses, strategies, and conversations over time.

Data from emails and other forms of internal communications

Natural data for new insights on different areas of construction can also be taken from emails. During this digital age, communication within the construction project team occurs through digital mediums, often through emails. Construction projects use emails for correspondence with the multiple agencies and their employees involved in the project. In one of our studies on an infrastructure project in Australia, promotional emails were sent out to the project team, as follows:

> This week, we put the spotlight on our partnership with [name of local sports team]. 'We're proud to be partnering with the [name of local sports team]. It's an important part of our commitment to leaving a positive legacy along our project corridor and across [name of place]', says [name of person], GM, Corporate Communications. Find out how [link], through this partnership, we've been able to help more than 45 000 people in [name of place].

The project experienced intense resistance from the project community, comprised of taxpayers and people from whom land was acquired. In infrastructure projects, it is seen that the anti-project discourses of these external stakeholders percolate to the internal stakeholders, such as the project team, often thereby affecting their perception of the project (Ninan et al., 2021). To counter this, the project circulated a weekly internal newsletter via email among all employees aimed to promote the project, such as seen with the email on the partnership with the local sports team. The internal newsletters also kept track of resistance groups and their activities, and highlighted how the project, in contrast, has a wider reach: 'Great news – our [link of Facebook page] now has more page likes than the two main action groups combined [names of action groups]'.

Communication patterns have changed through the use of tools such as emails. Mailing lists and the like allow practitioners to reach large groups of people simultaneously, and communication is no longer restricted to physical presence. This then creates new networks through which information flows on projects. Hossain (2009) studied email data and demonstrated that informal network centrality confers more influence in a project than formal organisational position. Thus, data from emails can inform construction project behaviours, such as coordination, innovation, power dynamics, network centrality, and other complex constructs that were traditionally only studied through interviews and observations, and that are now subject to subtle electronic influences that cannot be noticed physically. Ramalingam and Mahalingam (2018) show how analysing emails sent over the period of a year allows us to

understand how transnational design firms evolved practices to bridge cultural boundaries, for instance.

Emails are not the only internal communication tools used in projects. While project intranets have been in vogue for years, new age technologies such as WhatsApp have taken over the function of project communication and coordination. Recent research that we undertook in India (and that is yet unpublished) showed that the density of interpersonal communication was far higher in WhatsApp than in in-person meetings. While several project actors chose to stay silent in meetings, perhaps in deference to formal authority, they were extremely active on WhatsApp, providing information that was critical to the progress of the project. A social network analysis based on the WhatsApp transcript was telling, as the 'central' figures in the in-person networks were peripheral ones on WhatsApp, and vice versa. In some sense, this project exhibited dual organisational structures – one formal, as evinced in the in-person interactions, and an informal virtual structure, as evidenced in WhatsApp. The process of coordination also changed. Terse messages in slang accompanied with photographs were used to coordinate rapidly, as opposed to formal documents, presentations, or notes that were often present in review meetings.

Also important to these many routes of communication is understanding their conventions as detailed above, including, for example, the use of emojis, the extent of participation in these fora, typing cadence, and even typographical errors.

Social scientists also call for 'textual listening' (Boelstorrf et al., 2012) to be deployed with these new data sets. Such listening mimics existing understanding in fields such as cultural studies, where chosen artefacts are read as texts to be able to perceive ongoing cultural change. As mentioned earlier, chat data providing evidence of a switch in the centrality of personnel are important in understanding obstacles, catalysts, and key movers in the informal conduct of projects.

Data from other digital platforms

Data can also be captured from other digital platforms, such as innovation platforms, education platforms, and others. For instance, the i3P (Infrastructure Industry Innovation Partnership) platform allows players in the UK infrastructure sector to collaborate and share innovation stories. Data retrieved from this source can help researchers understand the most common innovations, the motivations for these innovations, different stakeholder

interests in these innovations, and so on. For example, a company reported an innovation for improving safety of Heavy Goods Vehicles (HGV) in the i3P platform, as below:

> Through our work directly involved in the logistics running of the business, we can recognise the need to improve cycle safety regarding HGV vehicles. We read in newspapers daily of incidents and accidents of this type[. As] specialists in the business, we need to push these improvements through to standard fitment.

Analysing this story gives us insights on the motivation for the innovation. The employee reported that newspapers reporting incidents and accidents relating to HGV vehicles was the motivation for this particular innovation. In another instance, a company's target of a 10 per cent reduction in the carbon footprint motivated innovations, as recorded in another post on the platform: 'In order to meet the project target of an 10% reduction in [name of owner] carbon footprint, the team must continually seek innovative solutions to the daily operational needs'. Researchers can look for similar naturally occurring data in diverse platforms to make sense of innovation, safety practices, quality performance, and other issues of interest.

Table 11.1 summarises these new age data set categories and identifies the types of findings that they enable. In each of these cases, new age data sets helped researchers understand a critical social process in construction projects that they would have had considerable difficulty unearthing by just relying on interviews and direct observations.

We only discuss some of the sources of new age data sets that can be leveraged by researchers in the construction management discipline. Data from these sources provide us with new 'ores' that have to be mined to make sense of how people behave in the construction industry. Also important to remember is that these new 'ores' may provide evidence of processes, behaviours, and feelings hitherto unavailable to researchers relying on traditional methods and data sets. Additionally, as we move forward, attention to new age data sets becomes critical to understanding the future of construction management research.

I've found 'new age' data. Now what?

Barley and Kunda (2001) eloquently convinced us to 'bring work back in' as we study engineering settings. It is clear now that digital technologies are

Table 11.1 Summary and examples of new age data sets

New age data set category	Example of research using the new age data set	Unique findings enabled by the new age data set in existing research
Data from social media	Twitter and Facebook posts of a metro rail project in India (Ninan et al., 2019)	The analysis helped understand how social media is used in the construction industry for marketing, branding, and the management of external stakeholders
Data from online news articles	Quotations of construction project spokesperson reported in news articles (Ninan et al., 2020)	The news articles helped understand the project's strategic response to externalities, such as accidents and delays
Data from emails and other forms of internal communication	Emails sent over the period of a year (Ramalingam & Mahalingam, 2018) WhatsApp communications of a project in India (unpublished)	Analysing emails helped understand how transnational design firms evolved practices to bridge cultural boundaries; WhatsApp communications led to the identification of informal social networks of information exchange on projects that were very different from formal networks observed in project meetings
Data from other digital platforms	Innovation stories posted in i3P (Infrastructure Industry Innovation Partnership) platform in the UK (Ninan et al., 2022)	Different motivations for innovations were found from the innovation stories, such as reports of accidents at other sites, and an organisation's target for reducing their carbon footprint

an integral part of the work that we do (actor network theory, for instance, freely allows for artefacts such as computers to be classified as actors/actants in organisational networks), and that business happens over intranets, emails, Facebook, Twitter, and other platforms. The study of engineering organisations can therefore no longer ignore these artefacts and needs to access digital communication as a critical data source for understanding contemporary organisational phenomena. The final product of the construction process is

a physical object that can be examined; however, the construction process as such can only be understood as a socially constructed phenomenon (Sutrisna & Barrett, 2007). New age data sets can give more insights on the 'social turn' in construction management research. Interpersonal relations in construction settings, such as trust, power, or coordination, can be studied through visual rituals depicted by artefacts, such as jokes, narratives, or forms of language (Gajendran et al., 2011) available in these new age data sets. Along with exploring current research areas, new age data sets inform practices that are currently not explored. For example, many conversations relating to the construction industry are only evident online and are not currently captured or analysed. Thus, communications evident in social media, online news media articles, emails, and other digital media can provide authentic and deep insights that would otherwise remain unseen. Such an exploration would help us understand how projects behave in the 21st century.

The process of accessing and analysing these data displays similarities with regard to how information is accessed and analysed in traditional qualitative research techniques. Tactically, researchers have long spoken about 'gaining entry' into a social setting and cultivating informants. Accessing new age data sets also requires strategies that help the researcher 'gain entry', as organisations will be rightfully worried about how the confidentiality of their data will be maintained. Building trust therefore remains a critical first step in the data collection process. While researchers may not need to rely on techniques, such as 'ethnographic interviewing' (Spradley, 1979), since the data are already recorded digitally and are available, there are disadvantages, particularly with regard to sifting through the data to find portions that are relevant. Thousands of emails are sent within organisations, sometimes even on a daily basis, and many may not be relevant to the researcher's question of interest. Sifting the wheat from the chaff could prove to be a time-consuming exercise. Of course, technology can come to one's aid here. Marwick (2013) suggests that hashtags can be used to bound and select relevant data on platforms such as Twitter. Henisz et al. (2013) attempt to use natural language processing as a tool to 'mine' large numbers of articles in digital media. However, none of these approaches have been perfected at the moment.

Beyond this, analysis techniques remain similar. The principles of coding that, for instance, are popular in traditional qualitative research (Strauss & Corbin, 1990) apply here as well. Emails or WhatsApp transcripts can be categorised, coded, and analysed to develop salient constructs and to understand the interplay between them. There is a tendency among researchers using these data sets to attempt quantitative analysis of their data, primarily because the volume of these data points and the ease by which they can be accessed through

computational tools is high. Wang and Taylor (2018), for instance, use Twitter data to computationally model human mobility in the face of natural disasters, and Breslin et al. (2020) use Twitter to map political attention to COVID-19. Indeed, this constitutes an advantage of using new age data sets and can allow authors to better validate and ensure the replicability of their data. However, there is also the danger of taking quantitative analysis a bit too far. As Marwick (2013) suggests in her analysis of ethnographic research on and using Twitter, such 'big data number crunching' can be valuable, but often ignores aspects such as the motivation to use a particular tool. On the other hand, she notes that new age data sets can help explicate participants' 'meaning making activities' and even enable the development of 'thick descriptions' (Geertz, 1973) of interactions. However, how and why people post on these new age platforms cannot be taken for granted. The context with which a user uses these platforms is salient and cannot be ignored. As Papacharissi (2012) notes, there may be a notion of 'play' amongst tweeters where the intent of posting on this platform as opposed to engaging verbally and directly is due to the ease with which data can be discredited on Twitter. Miller (2013), in a Facebook study, suggests loneliness as a cause for actors resorting to social media. These findings indicate that the context, the nature of the individual, and their motivation need to be taken into account in the process of understanding how a social setting unfolds; therefore, a qualitative approach (perhaps in addition to a quantitative one) might reap rich benefits in understanding the implications of such data sets. In sum, the basics of data access and analysis remain similar, but the nuances of dealing with new age data sets need to be fully internalised by researchers.

The final product of the construction process is a physical object that can be physically examined; however, the construction process as such can only be understood as a socially constructed phenomenon (Sutrisna & Barrett, 2007). New age data sets can give more insights on the 'social turn' in construction management research. Interpersonal relations in construction settings, such as trust, power, or coordination, can be studied through visual rituals depicted by artefacts, such as jokes, narratives, or forms of language (Gajendran et al., 2011) available in these new age data sets. Along with a foray into new age data sets, researchers must also intensify their efforts to locate motivation in relation to data. To this extent, each set and its particularities – Facebook and identity management, Instagram and identity culture, email and corporate networking, for example – will provide rich data in new contexts for continued work.

These new age data sets can also be combined with other data, such as interviews, to give some interesting insights. For example, in earlier work (Ninan

et al., 2020), we looked at news media articles to obtain data on 'what was communicated strategically to external stakeholders', and semi-structured interviews to collect data on 'what really happened at the site'. Contrasting both these data sets produced insights on the practice of strategic communication of information to external stakeholders in the case of an infrastructure megaproject. It is therefore not our contention that interviews and observations are inadequate means of data collection, nor do we suggest that new age data sets should replace these traditional means of data collection. Rather, our contention is that the construction industry is a heterogeneous constellation of actors, actions, and artefacts, and that new age data sets can complement interviews and observations with project participants, providing significant insights into on-the-job practices in a project as a primary data source and not as a secondary one. The traditional notion of such data as 'secondary' implies that it plays second fiddle to data collected during the direct presence of the researcher. Given the amount of work that happens 'out there' that is stored digitally, it is perhaps time to overturn this hierarchy and consider digital data and new age data sets as primary forms of data that cannot be ignored if we are to develop a true picture of the social settings that characterise construction projects.

It is worth pointing out here that researchers should necessarily also consider the ethical issues of using new age data sets. The practices of informed consent and privacy of respondents vary between private spaces and public spaces (Eysenbach & Till, 2001). Researchers should respect privacy and seek informed consent for private online spaces, such as those that require some form of registration or subscription and those not open to the general public. In contrast, public online spaces that are open for anyone to read may not require explicit consent, as contributors to these online fora are aware that their posts are publicly available and open to anyone to read (Dehkhoda et al., 2020). Data from these public spaces can be treated by researchers in ways similar to published material (Casselman & Heinrich, 2011). It is important to safeguard the privacy of respondents due to the traceability of quotes (Beaulieu & Estalella 2012). Here, too, there are ways to overcome traceability and make quotes 'Google-proof', such as cutting the length of verbatim quotes and hiding not only the respondent's name but also identifiers, such as place, associations, and so on. Another ethical issue with using new age data sets is the use of the published material without giving credit, thereby exploiting someone's intellectual property (Eysenbach & Till, 2001). Thus, researchers are advised to assess the ethical concerns of conducting an online naturalistic inquiry and obtain proper ethical clearance considering the risks to the respondents.

Conclusion

New age data sets comprise a new 'ore' that is currently not extracted and mined. This chapter thus calls for a research agenda in construction management using new age data sets as an important complement and a new direction to the current widespread use of interviews and questionnaires. A turn towards exploring these new age data sets can throw much light on some of the overlooked dynamics, such as identity, coordination, and strategic communication, in construction management research and reveal insights that have hitherto been hidden in conventional qualitative enquiries. Part of the reason for such data being overlooked is a traditional and conservative understanding of what counts as legitimate data from a physical and tangible social setting. In this, principles dear to digital ethnography need to lead the way such that increasing engagement among people – workers and managers – in the digital realm can no longer be treated as an additional and minor source of data. For daily life as much as for our work lives, the digital has become a constitutive arena for communication, identity formation, expression, feelings, and thoughts. Without giving this due cognizance, construction research methods run the risk of being, at best, inattentive and, at worst, downright inaccurate.

In this chapter, we describe new age data sets and ways of dealing with them in terms of collection and analysis. However, given their emerging nature, more lessons will need to be learnt and conveyed to a growing body of researchers who are aspiring to use these data. We encourage the research community in construction management to engage with these data sets and contribute to a body of knowledge on working with them in our field. Can we systematically think of new lines of enquiry that are now made possible by the presence of and our access to these data sets along the lines of those suggested in Table 11.1? Can we attempt to refine data collection and analysis methodologies, keeping both the nature of the construction industry and the data set in mind? Large projects will generate extremely large sets of data. What means can we use to make sense of this? We call upon researchers in the domain of construction management to acknowledge the primacy of these new age data sets and to work in cohesion to evolve techniques and best practices for their use.

In all cases, we argue for new age data sets as inaugurating an evolving paradigm vis-à-vis the social science turn in construction management research. Even as the social sciences grapple with, theorise, and produce guidelines for digital ethnography, as it were (Boellstorff et al., 2012; Pink et al., 2015), construction management research must necessarily delineate the implication of such in relation to ongoing work. New age data sets, in our understanding,

provide fertile ground for fruitful experimentation to build a variegated toolkit for researchers in the field. They are an evolving and exciting possibility for construction research to deepen its adoption of social science research methodologies and place a sophisticated and relevant, yet pragmatic, understanding of the social at the heart of its concerns. Yet, there are risks as well. Researchers may gravitate towards 'big data' that is readily available without paying due attention to contextual factors. An overreliance on the quantum of data may lead to compromises in the methods of analysis, and consequently in the final conclusions that are drawn as researchers become intoxicated with these new age data sets. Can the construction management research community develop the skills, rigour, and stewardship to use these data sets to unlock the mysteries of a complex industry? Or will we see abuse instead, as we have seen with questionnaires and interviews? Only time will tell.

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