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EDITED BY
Lorella Viola,
University of
Luxembourg, Luxembourg

REVIEWED BY
Adam Crymble,
University College London,
United Kingdom
Kahina Le Louvier,
Northumbria University,
United Kingdom

*CORRESPONDENCE
Paul Longley Arthur
paul.arthur@ecu.edu.au

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# Human journeys in the digital age: Advances and challenges in Digital Historical Migration Studies

Paul Longley Arthur* and Isabel Smith

School of Arts and Humanities, Edith Cowan University, Perth, WA, Australia

Accelerations in migration, mobility, and processes of globalization in recent decades have intersected with parallel developments in information and communications technology (ICT). These advances have had profound influences on historical and cultural research. With reference to a diverse range of international projects, this paper outlines major directions and opportunities in the growing field of Digital Historical Migration Studies (DHMS). The "digital turn" brings opportunities for integrating data on macro and micro scales, and finding new ways to combine and explore tensions between quantitative and qualitative materials, and between external observations of migrants and migration and self-representations by migrants. The plural and fluid nature of digital content also lends itself to multifaceted representations of migration that illustrate the complexities of lived experiences, and individual and collective identities. At the same time, digitalization in historical migration studies underscores the tensions between technological advances and methodological shifts, the need for self-reflexive approaches, the politics and power structures underlying migration data, and the ethical concerns around protecting migrants' data, privacy, and agency.

KEYWORDS

**migration, history, digitization, digital humanities, digital storytelling**

## Introduction

Migration and the mass movement and mobility of people around the world has been accelerating rapidly along with the macro processes of globalization—economic, political, cultural, and social—over recent decades. Since the late twentieth century these trends have been supported and enabled by parallel developments in information and communications technology (ICT) and computing. In migration studies, these digital innovations have led to new data-driven methods and the creation of vast online resources, as well as social networks and platforms that have sustained and expanded migrant communities and diasporas. This has opened up the growing field of Digital Historical Migration Studies (DHMS). Related to but distinct from migration studies and digital history, DHMS centers upon the development of migration history research through digital technologies. This paper surveys some of the key opportunities and challenges of DHMS. Drawing on a diverse range of international examples, with

particular reference to Europe, the United States, and Australia[1], it highlights advances such as the unearthing of new collections of data, the development of new analytical tools and models, and the rich qualitative materials found in digital storytelling. It focuses on examples that demonstrate such advances, but also methodological and theoretical tensions in the field such as navigating the power dynamics between researchers and migrants, and individuals and states, as well as the ethical considerations in protecting migrants' data, agency, and privacy. Case studies generally focus on digital historical migration research, though due to the interdisciplinary nature of DHMS they also draw upon insights from neighboring disciplines such as social research, social media analysis, and data analysis. In this way the paper aims to assist migration researchers in thinking about the benefits and challenges of DHMS, potential tools for integration, and key considerations and questions for future research. Put more broadly, it aims to reflect on what the digital brings to historical migration research and what historical migration research brings to the digital.

## Expanding data collections

Access to new data is one of the core drivers and foundations of DHMS. Data sets available to researchers are rapidly expanding and diversifying, going well-beyond numbers and metrics of people, places, and dates. At 2021's International Migration Research Network annual conference, researchers created, drew on, and analyzed data to investigate topics as varied as the relationships between migration policy and the subjective well-being of non-immigrant populations in Europe, the aspirations of refugee children who have arrived in Greece, and the barriers and opportunities facing economic migrants during the COVID-19 pandemic in the Czech Republic (Gheorghiev, 2021; Palaiologou et al., 2021; Tatarko et al., 2021).

Much of this research is based on born-digital data. Digital formats have dramatically expanded the possibilities for recording and tracking data in multiple, diverse forms. In particular, the prevalence of smartphones and social media has created many new opportunities for capturing previously undocumented information (Harari et al., 2016). Katja Kaufmann explains that smartphones are not only crucial lifelines and tools for migrants in managing logistics, creating connections, and maintaining relationships, but the technology also offers significant opportunities for "mobile methods" in digital migration studies — "using mobile communication technologies to study the social world" (Kaufmann, 2020, p. 168). Kaufmann refers to the new means of knowledge production enabled by smartphones, capturing rich stores of data coproduced between migrants and researchers through combinations of self-reported and automatically logged data. She cites the accessibility of customizable research apps, as well as her own research interviewing Syrian refugees, alongside which she used WhatsApp exchanges and in-person sharing of smartphone data such as photographs, screenshots, and emojis to enhance interview materials (Kaufmann, 2020).

The digitalization of analog archival materials has also laid foundations for DHMS. Digitization projects by state museums, archives, and other collecting bodies in particular have targeted materials relevant to migration histories. In Australia, an early and large-scale example of such a project was the Western Australian Museum's retrospective digitization of its "Welcome Walls" in 2012. These physical walls comprise over 400 panels with the names inscribed of more than 45,000 migrants who arrived at the ports of Fremantle and Albany in Western Australia (Western Australian Museum, 2022). Inscriptions are based on user-contributed data: registration forms detailing key information on migrants were completed by community members, a large number of whom were the migrants of interest, or relatives and direct descendants (Joseph et al., 2013). Users are able to search an online database for passenger names, arrival dates, ship names, and biographical data including family relations, and discover the physical panel number on which individual migrant names can be found. More recently, in 2021, Australia's Victoria State Government awarded an $800,000 grant to the Bonegilla Migrant Experience museum to digitize and make available its collection of migrant identification cards and other records held with the National Archives of Australia (NAA) (Brown, 2021). The museum—formerly the site of the Bonegilla Migrant Reception and Training Center, Australia's largest and longest-running reception center—has been digitizing ID cards of the more than 300,000 people who came through its doors.

Along with these discrete and targeted collections are databases bringing together larger patchworks of historical migration data. The NAA's online collections offer a consolidated space for materials including passenger, citizenship, and proof of arrival records and photographs. Similarly, the work of researchers has been transformed by the creation of Trove, an online database and discovery service hosted by the National Library of Australia (NLA) that includes digital collections from state and national museums, libraries, archives, and other organizations, as well as text-searchable content of over 700 historical Australian newspapers. The NLA also has a series of "research guides" on its website that compile themes of data for public access—notably including Australian Indigenous family history. These materials include births, deaths, and marriages records of Aboriginal people; newspaper press clippings, biographies, and autobiographies relating to missions and reserves; and the Bringing Them Home Project interviews regarding the forced removal of Aboriginal children, or Stolen

1 The authors acknowledge that this paper is Western-centric in its focus. Future discussions of DHMS would benefit from expanding the scope to regions and frameworks beyond European and settler-colonial examples.

Generation. Such data speak to a different type of migration in Australia: the forced internal displacement of Aboriginal people brought about by colonization. This underscores a fundamentally different view of migration, framed through a settler-colonial framework in which migration has negative consequences for Indigenous individuals and societies[2].

Some of the largest digitization projects have occurred through partnerships and collaborations. In 2012 the NAA announced a joint initiative with Ancestry.com to create an index and digitize records of the millions of people who arrived in Western Australia by sea or plane between 1897 and 1963 (Peters et al., 2017, p. 107–114). This followed a year after the launch of a website created through a partnership between the British Library and online publisher Brightsolid (operator of findmypast.co.uk, genesreunited.co.uk, and scotlandspeople.gov.uk) that transformed genealogical research through the digitization of more than 40 million pages of historical newspapers (BBC News, 2012). In addition to institutional alliances, partnerships have formed across nations. As part of their international cultural policy, the Netherlands has pioneered a Shared Cultural Heritage Programme, aimed at better understanding the ways that Dutch culture and history have been shaped by and influence the world around it. With the 10 partner countries of Australia, Brazil, India, Indonesia, Japan, Russia, Suriname, Sri Lanka, the United States, and South Africa, this programme encourages and provides funding to digitization projects that promote shared cultural heritage through principles of international cooperation, equality and respect between partners, and involvement of the public (Kingdom of the Netherlands, 2020). In Australia, this collaboration has resulted in such outputs as a video portrait series with Dutch migrants featured on the NAA's project website, "Destination Australia: Sharing Our Post-War Migrant Stories" (National Archives of Australia, 2022).

One of the greatest challenges in combining and creating large digital collections is the integration of disparate data sets. Data are often drawn from entirely different sources, formats, languages, and jurisdictions. Some of the most extensive work in integration has been carried out around Holocaust records. The Arolsen Archives, known until 2019 as the International Tracing Service (ITS), holds the largest collection of information on Nazi victims, including documents on displaced persons, forced labor, and concentration camps (Arolsen Archives, 2022). In 1948, the ITS began collecting and storing individual case files and other documents in an internationally coordinated effort to institutionalize records in the interests of survivors and prosecuting perpetrators (Rass and Tames, 2020, p. 23). It was also early to begin systematically digitizing records. Today the Arolsen Archives works with the European Holocaust Research Infrastructure (EHRI) in focusing on the preparation and sharing of digital data with other archives. Along with institutions such as Yad Vashem; the United States Holocaust Memorial and Museum; the NIOD Institute for War, Holocaust, and Genocide Studies; and the Wiener Library, these groups are concerned with working together to enable widespread access to and digitization of Holocaust records (Rass and Tames, 2020, p. 24). In 2021, the EHRI also announced an initiative to drive collaborations with micro-archives (Arolsen Archives, 2022). Unconstrained by national archival laws, the Arolsen Archives has made a vast amount of its data available online (Rass and Tames, 2020, p. 24). Its data form the basis for the Transnational Remembrance of Nazi Forced Labor and Migration project (TransRem), which traces the wide variety of paths taken by those migrants now defined as displaced persons following World War II. TransRem follows the journeys of individuals from their places of birth, to sites of forced labor, to the towns they returned or emigrated to, spanning Europe, the United States, Australia, New Zealand, and South America. TransRem's website uses a combination of interactive maps that plot out quantitative geographical data, and story maps that feature more detailed narrative information and images. Such archives are exemplary models in integrating and opening access to data relating to DHMS.

## Evolving tools of analysis

Digital Historical Migration Studies is also advancing through developments in data analysis. Data visualizations offer particularly striking examples of the potential for analyzing and presenting migration histories. Concerned with the movement of people over time, and numbers of people from various geographical and cultural backgrounds, DHMS lends itself to visual representations of journeys and mass movement. The plethora of interactive digital maps of migration, several of which are referenced in this paper, speaks to this. Researchers are also using more abstract representations. Cruz et al. (2018) at Northeastern University created a visualization entitled *Simulated Dendrochronology of Immigration to the United States 1830–2015*, which illustrates population growth through the symbolic imagery of an aging tree trunk, with each ring of the trunk representing a decade of growth and each cell representing 100 immigrants from a region. *The Global Flow of People* (Sander et al., 2014) illustrates estimates of migration between regions of Asia, Europe, Africa, and the Americas through interactive circular plots that become animated when users select certain regions. These examples demonstrate the potential in DHMS for analyzing and sharing migration data in particularly accessible and engaging formats.

Researchers are also using digital technologies to develop their own models and software for analysis. In their work investigating a genealogical database of over 800 million

2 For a recent discussion on the tensions around migration studies and the recognition of settler colonialism, see Ellerman and O'Heran (2021). See also Collins (2022).

names, Otterstrom and Bunker (2013, p. 544–569) developed a conceptual model to identify the connections between historical migration patterns and intergenerational family networks across three case studies in the United States. The authors demonstrate the relative pull of different cities in attracting migrants away from their generational hinterlands across different historical periods. Otterstrom and Bunker illustrate, for example, the incredible pull of small mining towns during the gold rush—on par with that of large cities—to attract faraway migrants. Others are developing corpus linguistics models. Viola and Verheul's (2020) innovative interdisciplinary work combines quantitative and qualitative methodologies to unearth patterns in historical public discourses around migrants and migration over time. Their analysis of the United Kingdom's *Times Digital Archive* between the years 1900 and 2000 merges a computational linguistics method with a discourse historical approach to look beyond whether a word has changed in meaning over time, and explore potential mechanisms involved in the construction of collective understandings (Viola and Verheul, 2020, p. 2). Their inquiry reveals the tendency for discussions around *emigration* to be framed through positive words such as "promoting" and "relief," while discussions around *immigration* are often framed through negative terms such as "exclusion," "undesired," and "restricting;" furthermore, over the course of 100 years, discourses around immigration have focused increasingly on ethnic minorities rather than on larger national groups (Viola and Verheul, 2020, p. 14). In another study, the authors examine a collection of Italian ethnic newspapers published in the United States between 1898 and 1920 (Viola and Verheul, 2019). Looking at the words of the migrants themselves, they trace the complex negotiations of identities and narratives by Italian migrant communities and individuals, balancing their attachment to homeland and heritage on the one hand, and immersion in their new society on the other (Viola and Verheul, 2019, p. 940). The authors argue that their findings challenge and transcend the traditional binary view of migrant "integration vs. isolation" by demonstrating how ethnic media helped migrants create "a united identity that could exert political force and negotiate inclusion" within the United States (Viola and Verheul, 2019, p. 935). This work demonstrates the potential for new, cross-disciplinary digital methods to analyse very large sets of data across long periods of time—a data-driven methodology for the longue durée approach in historical studies. It also highlights the potential of looking to long-neglected sources and underrepresented languages in historical and migration research.

## Digital storytelling

New forms of migrant data are also being collected, analyzed, and presented through digital storytelling. This approach offers the field of DHMS more explicitly narrative-based qualitative material, centered on migrants' voices and subjective experiences. It was popularized in the 1990s by Joe Lambert, who founded the Center for Digital Storytelling in California, now known as StoryCenter (Lambert, 2013). Lambert developed a seven-step approach for individuals to create their own stories, from conception through production and sharing. While the term *digital storytelling* has since grown to include a broader range of methods and outputs, it generally refers to any projects that combine the art of storytelling with digital multimedia, including video, photographs, text, narration, and music (Trimboli, 2020, p. 5–6).

Digital storytelling has become a particularly common mode for recording contemporary migrant stories in Australia. The Australian Centre for the Moving Image (ACMI), based in Melbourne, Victoria, carried out a digital storytelling programme between 2002 and 2016, coproducing hundreds of stories with members of the Victorian and wider Australian community (Simondson, 2009). Many of these are now available on ACMI's YouTube channel. Australian Centre for the Moving Image identify particular themes in these stories, for instance, the experiences of Indigenous people, veterans, and young people (Australian Centre for the Moving Image, 2017). Migration also stands out as a theme. In her analysis of the collection, Daniella Trimboli estimates that approximately half of the stories are concerned with "culturally diverse" community narratives of migration and ethnic identity (Trimboli, 2020, p. 6). The NAA has also run a series of projects that record historical migrant stories through digital storytelling. "Destination Australia," a digital collection and website by the NAA, features video portraits of individuals who have migrated to Australia, as well as over 22,000 photographs taken by government photographers between 1946 and 1999 to record people arriving and living in Australia (National Archives of Australia, 2022). The NAA's 2014 exhibition *A Ticket to Paradise?*, which continues to appear today around Australia as a touring exhibition, combines Australian Bureau of Statistics archival data with personal testimony, photographs, and memorabilia to "tell the story of Australia's development through migration" (Gibson Group, 2019). Alongside object displays, thematic text panels, and large photographic displays, it features an interactive globe with five touch screens, where visitors can navigate an animated map showing yearly migration patterns to Australia, as well as launch a series of migrants' first-person stories. Significantly, *A Ticket to Paradise?* also allows audiences to contribute their own stories, either through facilitated workshops or a custom-built iPad application available in the physical exhibition space. "Destination Australia" also offers users the opportunity to contribute their own stories by uploading narrative text, images, and captions, and tagging locations and themes.

Independent researchers, artists, and creatives with lived experiences of migration are also developing their own

innovative and experimental expressions of digital storytelling. Matt Huynh, a Vietnamese Australian visual artist and storyteller, has created a series of interactive comics, illustrations, and animations detailing various experiences of migration in Australia and beyond. His 2019 work *Cabramatta* is an autobiographical interactive comic about growing up in a suburb that was both home to a community of Vietnam War refugees and the country's heroin capital (Huynh, 2019). *The Boat*, an interactive graphic novel released in 2015, details the story of Mai, a 16-year-old girl sent alone to Australia from Vietnam following the fall of Saigon (Huynh, 2015).

## Agency, power, and bias

As the above examples demonstrate, the digital turn has opened up opportunities for migrants to record their own stories, in their own words. Moreover, the plural and fluid nature of digital content, ever-evolving and refreshing, lends itself to multifaceted representations of migration that illustrate the complexities of lived experiences and identities[3]. Social media and smartphones in particular have created a plethora of new discourse and material around migration. Georgiou and Leurs (2022, p. 668–689) argue that smartphones operate as "personal digital archives" where migrants can author and curate their own experiences and subjectivities, offering voice, agency, and autonomy in the face of external representations constructed by conventional Eurocentric media and migration research. These multifaceted digital forms offer modalities where migrants can tell their own stories against the grain of mainstream representations. Kaufmann cites the potential for the coproduction of smartphone data between researcher and migrants, allowing migrants to act as subjects rather than objects of study (Kaufmann, 2020).

Within DHMS, projects may directly or indirectly involve migrants. Roopika Risam describes two approaches: non-collaborative studies, which use existing data sets without collaborating with those who collected data or with migrants; and collaborative studies, which are produced by and with migrants (Risam, 2019, p. 571). In both forms of work, researchers must recognize and moderate their influence and bias when presenting migrant stories. Collaborative projects, though potentially empowering for migrants, can also involve dynamics in which researchers exert authority, often unwittingly, over what can become their "subjects" of study. In her investigation of public engagement and participation in 12 museums and galleries across the UK, Lynch (2011) found that despite their best efforts, organizations collaborating with communities often had in place invisible barriers to genuine engagement. Lynch referred to recurring themes such as policies based on "helping-out," and community collaborators being "treated as 'beneficiaries' rather than 'active agents'" in projects and content development (Lynch, 2011, p. 20). Similarly, in *Museums, Heritage and Indigenous Voice: Decolonizing Engagement*, Onciul (2015) explores the growing practice of "community engagement" in museums through four case studies of heritage projects involving First Nations Blackfoot communities in southern Alberta, Canada. Onciul warns, and demonstrates through her case studies, that if done poorly, community engagement can in fact be disempowering to communities: "Engagement creates risks and costs for participants and is not necessarily as empowering or beneficial as current discourse often purports" (Onciul, 2015, p. 2).

As by its nature DHMS is concerned with the historical, often it may not be possible to facilitate collaborative studies, especially for those projects that focus on events deep in the past. The migrants of interest may no longer be alive, and groups or institutions that gathered the data sets may not be contactable. Again, this sets up power dynamics in which researchers hold authority over the analysis and presentation of data.

Indeed, the voices and agency of migrants contend with the power dynamics of the times in which they are recorded and retrieved. The experiences of individuals—especially the "ordinary" and even more so those deemed "stateless" and "other"—can be written out and distorted by powerful discourses of state archives and authorities. Researchers in DHMS are finding ways of unearthing these past migrant voices, for example Viola and Verheul examining the discourse of Italian migrants in ethnic newspapers (Viola and Verheul, 2019). Projects are also reading against the grain of "authoritative" data traditionally used to perpetuate dominant discourses. The Real Face of White Australia, created by Bagnall and Sherratt (2010), is one such project. Using facial detection script to analyse records from the NAA, this website uncovers the faces, names, and other biographical details of thousands of individuals who were deemed not "white" and hence forced by the state to carry documents allowing them to move across borders. Exhibiting their faces en masse, the Real Face of White Australia creates a striking display that challenges dominant and ongoing discourses around race and national identity with the lives and experiences of "othered" Australians.

These examples illustrate ways that researchers can work to interrogate and contest the underlying power structures and biases through which historical materials are produced. Sets of data are always formed through a series of choices and omissions that reflect the circumstances and politics of those

3 At the same time, individuals struggle against dominant discourses and frameworks. Trimboli argues that digital storytelling projects can embed multicultural subjects "in relations of power that both constrain and mobilize performances according to particular notions of whiteness" (Trimboli, 2020, p. 7). She points, for example, to representations that depict protagonists as "ethnic" as defined against an implied white audience, or implicitly underscore the national aspirations of a white Australia.

times in which they are made and accessed. Olaf Berg reminds us that data are never found but always created, through many moments of complex interpretation and decision-making (Berg, 2020, p. 263–289, cited in Rass and Tames, 2020, p. 33). Rass and Tames explain that, increasingly, researchers in migration studies and historical migration studies have shifted their attention to question terms that were once accepted as objective descriptors—such as "migrant" and "displaced person"—and examine the social processes that give rise to these political categories (Rass and Tames, 2020, p. 26). However, Rass and Tames warn that with the advent of big data we can lose sight of this critical approach; they caution "that we are not seduced by it and, as a result, view it uncritically" (Rass and Tames, 2020, p. 29). This lays out a tension brought about by digitization and digitalization—between ICT advances and what is often termed the "reflexive turn" in migration studies. Again the work of Viola and Verheul is of note here. In their examination of discourses around migration in the UK's *Times Digital Archive*, the authors interrogate the very concepts on which their work is premised. They do not simply trace patterns in migration in terms of how the movement of people changes over time, but critically examine the construction of concepts like "migration," "immigration," and "emigration." By interrogating the changing semantic and historical contexts around these concepts, Viola and Verheul unearth the potential processes through which societies construct their collective meanings.

In her comparative analysis of geospatial data visualizations of migration, Risam warns of the political consequences of producing visualizations of migration that fail to interrogate their own methodologies and political categories (Risam, 2019, p. 566). She focuses on two projects in particular, "The Flow Towards Europe" and "Crossing the Mediterranean Sea by Boat." "The Flow Towards Europe," created in 2018 by Finnish startup Lucify, uses data from the United Nations Refugee Agency to show the movement of migrants into European countries from 2012 to 2018. Risam explains how this visualization uses the term "refugee" as an uninterrogated catch-all, which obfuscates different migrant motivations, experiences, and the complexities of migration (Risam, 2019, p. 572). Further, she argues that other choices around language, visual rhetorics, and spatial modes play into political narratives that dehumanize and frame the migrant as the problematic "other"—for example the repeated use of the word "crisis," and the use of dots to represent individuals moving in "unimpeded waves" across national borders (Risam, 2019, p. 572). In contrast, Risam looks at "Crossing the Mediterranean Sea by Boat," a 2017 project by the University of Warwick, the University of Malta, and the Hellenic Foundation for European and Foreign Policy. Based on over 250 in-depth qualitative interviews conducted across 2015 and 2016, this project avoids simply using the preexisting category of "refugee" and explains that it features "people who have entered the European Union, or who are contemplating making the journey, by traveling across the Mediterranean Sea without authorization" (University of Warwick, 2019). The project website traces out the experiences of individuals using interactive story maps, detailing reasons for migration such as escaping sexual violence or conscription, and displaying individual maps plotting out the unique phases of each journey rather than a single map showing thousands of nameless dots. Risam points out that such linguistic, visual, and spatial modes counter the "migrant-as-a-problem" narrative (Risam, 2019, p. 573–574).

Researchers can also practice self-reflexivity simply through acknowledging the partiality and subjectivity of their sources. The Transnational Remembrance of Nazi Forced Labor and Migration project (TransRem), based on data from the Arolsen Archives, traces the wide variety of paths taken by those migrants now defined as displaced persons following World War II. Before exploring the interactive map, users must first read a disclaimer that details the limitations of the sources on which the map is based, such as the standardization of dates, imprecise geographical data, and the potential for error in handwritten documents filled out by those applying for the status of "displaced person." The disclaimer states,

> No guarantee can be given that these data are complete or correct. Rather, the movements displayed are a visual representation of information which was provided by historical figures and recorded at a specific point in time in the historical sources on which the map is based. The people concerned may, of course, have provided false information deliberately or may have remembered things inaccurately. This does not reveal any underlying "methodological inaccuracy" of the project, but highlights instead the fundamental challenge posed by historical sources: they can never convey an objective picture of the past (Arolsen Archives, 2022).

## Navigating ethical tensions

Researchers in DHMS thus face a range of questions and considerations around the ethics of working with the data of migrants—both indirectly and directly—and negotiating the power dynamics between researchers and participants, between states and individuals. Many careful decisions must be made regarding how data is obtained, contextualized, analyzed, and presented to audiences in a way that protects the data, agency, rights, and privacy of individuals. Marie Sandberg and Luca Rossi are particularly concerned with these ethical questions when dealing with ethnographic, qualitative, and "big social data" of migrants, who they describe as "subject to precarious and insecure life circumstances" (Sandberg and Rossi, 2022, p. 4). Drawing on Annemarie Mol's notion of care, the authors argue that working with big digital data requires the development of new models that approach migrants' digital data with care before—but also during and after—the data collection and research. They highlight, for instance, the challenges of

obtaining informed consent from individuals whose data has been taken from social media and public forums, and pose the question of how the use of migrants' data might feed back to and benefit migrant communities (Sandberg and Rossi, 2022, p. 3–4).

Current research is exploring and beginning to address these challenges. Reflecting on their work on PERCEPTIONS, a project identifying public narratives on Europe and migration to Europe by analyzing social media data, Mahoney et al. (2022) outline a number of methods used to navigate the ethical tensions of their work. For example, in dealing with the issue of informed consent, the authors made the decision to use only explicitly public material where authors have no expectations of privacy (hence using only Twitter data). The authors also approached the existing power dynamics and political categories around migration with care, avoiding "profiling" individuals by identifying and labeling them as migrants, and only identifying individuals with over 10,000 followers (Mahoney et al., 2022). Concerning the protection and privacy of data, they developed principles around data sharing between partners: only those project partners deemed able to provide adequate data protection (in line with General Data Protection Regulation) were responsible for data processing, and partners such as law enforcement were not given access to raw data (Mahoney et al., 2022, p. 232–234). Similarly, in their discussion around the tensions between pushes for open data and the ethics of migration research, Bloemraad and Menjívar (2022) suggest measures including the use of oral consent, confidentiality training for those involved in data collection, and the masking of personal and identifying information. They assert that "More broadly, researchers should double-down on data security, from data collection and storage to analysis and the communication of findings" (Bloemraad and Menjívar, 2022, p25–26). Bloemraad and Menjívar also recommend that rather than following generic ethical guidelines, researchers thoroughly, and critically assess the idiosyncrasies of their particular studies and engage in a three-step process of interrogating open-science and ethical principles, evaluating the "vulnerability" of migrants involved, and then forming methods appropriate to their projects.

## Conclusion

Vast and growing digital data collections, tools, and theoretical frameworks have opened up the field of DHMS. Newly digitized migrant records, analytical models, and creative modes of digital storytelling offer diverse combinations of quantitative and qualitative materials, and opportunities for data produced by and with migrants. At the same time, these examples underscore the questions and challenges around how researchers navigate the structures of power underlying data, the biases of their research, and the ethical tensions inherent in working with human data. Future surveys of this field might expand the scope to a more diverse range of examples, particularly projects from non-European and Euro-Settler-Colonial societies, to unearth further opportunities and advances in DHMS and to explore further complexities to the tensions and challenges of the work. This work might help researchers in approaching questions and methods around the protection of migrants' data, voices, agency and security, and in integrating diverse voices and subjectivities when representing these complex histories and experiences.

## Data availability statement

The original contributions presented in the study are included in the article/supplementary materials, further inquiries can be directed to the corresponding author.

## Author contributions

Both authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Publisher's note



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