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[Accepted for publication (28/04/2023)]
(Accepted Author Manuscript)

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Abstract

This study moves beyond the conventional focus on technology access, adoption, and participation in communities, and instead presents a perspective on digital inclusion as a complex process of both empowerment and subjugation. Drawing on Foucault's theorisation on subjectivity and power, our case study of community health workers in rural India, reveals that the adoption of an mHealth application simultaneously subordinates and strengthens the subjectivity of the community health workers. The study explicates the process through which the health workers oscillate between the enhancement of their individual efficacy, and their submission to institutionalized power as facilitated through the mHealth application during their everyday work practices. Thus, by shifting the focus from 'who' is digitally included to 'how' they become digitally included, our research provides a fresh perspective that enriches and deepens the discourse of digital inclusion. It generates both theoretical and practical implications for anyone interested in understanding digital inclusion from a more granulated and practice-based perspective.

Keywords: digital inclusion, power, subjectivity, Foucault, mHealth, empowerment

1 Introduction

The discourse on technology and social inclusion often implies social categories or demographic segmentation of identity demarcated by particular division lines, e.g., gender, sexuality, age, race, class and so on. Certain social groups are defined as subjects of othering i.e., disadvantaged, or marginalised, who need to be supported, included, and integrated into mainstream society. Research on digital inclusion thus, often focuses on digitally connecting the excluded in these categories. However, as research on intersectionality (Rodriguez et al., 2016; Trauth et al., 2016; Zheng & Walsham, 2021) has shown, such categorisation is often overly simplistic as identities are multi-dimensional and intersectional, and there are also divisions within the same identity-based groups.

While research on digital inclusion, i.e. digitally-enabled social inclusion, is often concerned with *who* should be included, less emphasis is put on *how* they are included, and what are the conditions that enable inclusion or, for that matter, exclusion; whether individuals are included as passive participants due to the existing power structures and institutional norms, or as social

actors with a level of subjectivity over their own work and life, and their role in society. Zheng and Walsham (2021) call for information systems (IS) research to move

beyond the concept of digital divide, (the gap between haves and have-nots), or a single-axis analysis of digital inequality and social exclusion. They propose to conceive individuals not merely as *users* of digital technology but as *actors* who are positioned in multiple layers of power relations. The former implies an emphasis on digital accessibility and adoption, whereas the latter focuses on the digital mediation of the production and constraints of agency in social structures and power relations.

From a technological perspective, the literature on digital inclusion has often focused on understanding why certain groups of a population do not possess access or skills to use digital technology. Seeing individuals as *users* entails a focus on their immediate interaction with technology, that is, without seeing them as *actors* locally situated in a social context that is subsumed within social structures that shapes their everyday perception and use of artefacts (Zheng & Walsham, 2021). Thus, any inclusion or exclusion that takes place for a human actor is always in relation to other human actors or institutions, cultures, and norms, which are constituted by power relations and shape the reference point of what inclusion or exclusion means for that actor.

For instance, in some contexts where women are digitally excluded, it is not necessarily due to the lack of skills or access to technology, but because of the contextual gendered norms and power structures. For example, in India, people of lower castes may feel excluded in relation to those of higher castes due to their disadvantaged social position (Sankaran et al., 2017). Even when they are online, women of lower class or from a marginalised group are still less likely to speak up or have their voice heard (Jia et al., 2016). Dy et al. (2017) refute

the idea that the Internet is a neutral platform for entrepreneurship by showing that women digital entrepreneurs in the UK are still subject to systemic inequality, such as disadvantages associated with class, gender and race.

In this paper, we move beyond the identity-based approach and the binary oppositions of digital inclusion and exclusion by situating individuals not across the digital divide but as situated in power structures and relations. Through a case study of an mHealth application by community health workers (CHWs) in a primary health care (PHC) setting in rural India, we explore what it means to be included, under what terms are individuals included, and approach this question from the perspective of Foucault (1982)'s analysis of subjectivity and power. This paper seeks to advance the understanding of digital inclusion in IS research through highlighting the complexity and paradoxical effect of digital adoption, i.e., how a

digital technology shapes human subjectivity as underpinned in power structures of the context. From this perspective, we show that digital technology, embedded in day-to-day practices, should be seen as what Foucault calls 'technology of power' (ibid.) which has the dual effect of both subject making and subjugating, or empowering and disempowering. As such, inclusion and exclusion are relative and co-constitutive, and digital inclusion is a process in flux rather than a fixed end point.

In the rest of the paper, we will first review the literature on digital inclusion in IS research, where this paper is situated, followed by the theoretical conception of subjectivity and power

by Michel Foucault. We then present the case background on mHealth and community health workers in India and details of the methodology. The findings section reveals the dual processes of technologies of power and the paradoxical effect of empowerment and disempowerment of the CHWs. Section 6 discusses theoretical implications of the study for digital inclusion research, and how the Foucauldian perspective may add value to our understanding about the relationships between technology, power, and social structures, as well as implications for practice.

2. Digital Inclusion in IS Research

The research on technology and social inclusion in the IS literature has been centred on the divide between the "haves" and "have-nots", or the diversity in the IT profession (Trauth, 2017). However, it has also long been recognised that social inclusion is multi-faceted, and involves multiple dimensions of social differences, inequality, and stratification (Urquhart & Underhill-Sem, 2009; Zheng & Walsham, 2008; Warschauer, 2003). Therefore, social inclusion in the digital society concerns not only on whether individuals have the skills and resources to access and benefit from digital technology, but also on "the extent that individuals…are able to fully participate in society and control their own destinies" (Warschauer, 2003, p. 8). Thus, digital inclusion goes beyond the digital divide and includes a multitude of other divisions such as age, gender and education (van Dijk & Hacker, 2003).

The relationship between digital technology and social inclusion is a complicated one because digital practices are always embedded in social processes, just as individuals are always situated in deep seated socio-cultural norms, power structures and institutional environments (Madon et al., 2009). Furthermore, inclusion often co-exists with exclusion. As Zheng and Walsham (2008, p. 238) point out, "[i]nclusion in one space can co-exist with

exclusion in another space (p. 238)". This is because individuals are positioned at the intersection of multiple systems of power, thus digital inclusion and exclusion are relational and contingent upon the interaction of a myriad of social factors (Trauth, 2017).

A quick search of IS journals with the key word 'inclusion' shows that there has been a growing body of research on digital inclusion in IS journals since 2008, notably burgeoning over the last 5 years. Table 1 includes relevant papers to this topic from the basket of eight journals - representatives of mainstream IS literature, as well as from two more multi-disciplinary journals: *Information Technology and People (ITP)*, and *Information Technology and Development (ITD)*, which are more open to research in relation to digital inequality. A number of papers have examined how digital technology may facilitate or hinder the participation of refugees in social integration within communities and society (Alam & Imran, 2015; Díaz Andrade & Doolin, 2016; Iazzolino, 2021; Martin & Taylor, 2021; Schoemaker et al., 2021). With the development of mobile banking and fintech, financial inclusion has received some attention in the last few years (Joia & dos Santos, 2019; Kemal, 2019; Senyo et al., 2020; Chatterjee, 2020; Tan et al., 2021). Gender (Naidoo et al., 2019), disability (Newman et al., 2017) and sexual minority (Light et al., 2008) remain underrepresented topics in IS research. Even though this is not an exhaustive review, it

suggests that only a small number of digital inclusion research papers appear in the basket of eight journals, whereas the majority are published in journals like ITD and ITP.

What does digital inclusion mean when discussed in these studies? We identify four levels of digital inclusion 1) digital inclusion as technological adoption; 2) digital inclusion as digitally enabled participation in communities and society; 3) digital inclusion as digitally enabled empowerment; and 4) digital inclusion as structural transformation. While each level of inclusion necessarily entails the previous one(s), e.g., digital empowerment is usually predicated upon some form of technological adoption and social interaction, there are a majority of studies that investigate digital inclusion as technological adoption, compared to those that explore subsequent social participation, while a smaller subset of research examines how digital technology might facilitate individual empowerment, i.e., sense of agency and control, as part of digital inclusion.

Table 1 presents some examples of research with different perceptions of digital inclusion. For example, studies on financial inclusion (Joia & dos Santos, 2019; Kemal, 2019; Senyo et al., 2020; Chatterjee, 2020) tend to focus on the adoption and diffusion of digital banking

services, perhaps due to the lack of infrastructure and institutional support present in this context. Studies that conceive digital inclusion as participation often explore the role of technology in building social capital (Alam & Imran, 2015), enabling community participation (Armenta et al., 2012; Baron & Gomez, 2013), or the importance of social networks, community and institutional support in sustaining digital inclusion of

Inclusion as	Perception of 'the included'	Examples
Technological Adoption	Individuals become users of a particular digital technology	(Chohan & Hu, 2020; Ferreira et al., 2016; Hill et al., 2008; Joia and dos Santos, 2019; Klecun, 2008; Letch & Carroll, 2008; Madon et al., 2009; Martin & Taylor, 2021; Newman et al., 2017; Pal et al., 2020; Pethig & Kroenung, 2019; Ratliffe et al., 2012; Senyo et al., 2020)
Participation	Individuals become members of communities and mainstream society through the use of digital technology	(Alam & Imran, 2015; Armenta et al., 2012; Baron & Gomez, 2013; Gorbacheva et al., 2019; Madon et al., 2009; Newman et al., 2017; Ratliffe et al., 2012)
Empowerment	Individuals as actors rather than passive recipients; inclusion entails greater agential capacity and opportunities, higher level of autonomy and control.	(Baron & Gomez, 2013; Díaz Andrade & Doolin, 2016; Iivari et al., 2018; Kemal, 2019; Light et al., 2008; Naidoo et al., 2019; Tan et al., 2021; Zheng & Walsham, 2008; Tan et al., 2021)
Structural Transformation	Individuals become agents of change	(Tan et al., 2021)

Table 1. Four layers of digital inclusion and examples in the IS literature.

disadvantaged groups (Madon et al., 2009; Newman et al., 2017; Ratliffe et al., 2012).

A small number of studies have shown the effect of empowerment[1], i.e., improving the level of agency, through digital inclusion. For example, Baron and Gomez (2013) show that

[1] Empowerment is both the process, and the outcome of the process, by which people experience a gain in their individual capabilities. This should lead people to reflect and perceive themselves as able to act on their choices/beliefs, to transform those choices into actions and outcomes that are valuable to them (Pandey, 2021)

participants of public access computing feel a stronger sense of self-efficacy, self-esteem, and a sense of increased control of one's life, in addition to connecting with friends and family and building social networks. Sen's capability approach has been applied to examine capability expansion, i.e., greater opportunities for wellbeing and agency achievement, in digital inclusion (Díaz Andrade & Doolin, 2016; Zheng & Walsham, 2008). Díaz Andrade

and Doolin (2016) apply the approach to show how information and communication technology (ICT) enhances refugees' level of agency and well-being, fostering their participation in society and control over their lives. Zheng and Walsham (2008) argue that social exclusion can be perceived as 'capability deprivation' and point out that one could be digitally connected yet still deprived of 'agency freedom' to access or use information to achieve one's own goals due to institutional or structural barriers, and that there is a need to pay attention to the conversion factors from use of digital technology to capability enhancement.

The fourth level of digital inclusion which eventually leads to structural change was rarely found in the literature. This refers to the situation where digital users are not only included in terms of participation and empowerment, but also become 'agents of change' (Pansera & Owen, 2018). One such example is the case study of Alibaba's successful Fintech application Yu'E Bao (Tan et al., 2021), where grassroots consumers were empowered by the saving/investment app that helped improve their skills, capacity and confidence in basic wealth management, which inadvertently led to the evolution of the technology itself in order to fulfil the growing demands of grassroots consumers.

Existence of structural transformation through digital inclusion is rare, and this study

contributes to some extent as to the reason why this might be the case. Existing research on 'digital inclusion as empowerment' largely focuses on the positive effect of digital technology i.e., on individual agency, e.g., improving one's level of autonomy and capability to take control of one's life, or to contribute and participate in communities. In other words, it is assumed that individual empowerment usually takes place without any change to existing power structures, the very power structures that create inequality and deprivation of individual agency in the first place. Few studies have investigated the source of digital inequality, deprivation of agential capacity by paying attention to existing power structures or considers whether there exists a possibility of empowerment at a structural level of the disadvantaged or excluded groups, and if not, why.

Incorporating Power in Digital Inclusion

We argue that it is necessary to explicitly incorporate an analysis of power structures because digital inclusion, like social inclusion has the potential to take many forms under intersectional power structures. This is in line with Heeks (2022) who discusses adverse digital inclusion, where individuals are subjected to various oppressive or unjust conditions even when they are digitally included. For example, privacy and surveillance concerns have been part and parcel of digital societies where individuals also benefit from being included in

digital networks.

Conventional conceptions of power assume that power exists as an overarching capacity that is all-possessive and exercised over others in a mechanical manner. Power is seen primarily as something that represses, coerces, or denies (Bloomfield & Coombs, 1992; Clegg, 1998). Such a zero-sum notion of power implies that shifts in organisational power are the result of conforming changes in the organisational distribution of resources, such as information, which confer power on their possessors. This understanding of power can be seen in the early studies of information systems in organisations (Pettigrew, 1972; Markus, 1983; Jasperson et al., 2002). The weakness of this approach is that it fails to consider that power is relational (Clegg, 1998). That is, power is not possessed but is a capacity for action that resides in social relations subsumed in social practices produced and reproduced in everyday life (Foucault, 1982).

Foucault goes beyond a perspective that centres a locus of power on violence or resistance and instead links human subjectivity, i.e., the creation of self-perceptions and identities, with the exercise of power (Foucault, 1982). Such a perspective of power enables us to understand how power circulates in every-day life, and the impact it has on human actors, their identity, and self-perceptions, as well as their relationships with institutions, organisations, and other human actors. In short, what differentiates Foucault's concept of power from other theories of power, is that he links power with human subjectivity, and examines power not just in terms of control and coercion but also in its positive, enabling and subject-making effects.

Instead of privileging technological artefacts, Foucault focuses on the behavioural and social

technologies encoded and embedded in material technologies (Hassan, 2011; Bakardjieva & Gaden, 2012). When it comes to linking Foucault with technology use, Bloomfield (1995, p. 497) stresses that in seeing "reality as materially heterogeneous and relational, it becomes valuable to employ Foucault's relational notion of power. This is because technology increasingly mediates how power circulates, is exercised and what it produces".

Within IS research, Foucault's concepts have been widely adopted, including the research on surveillance technologies (Lyon, 1994; 2003), the use of information and databases (Poster, 1996), discipline, information use and technologies at work (Zuboff, 1988; Webster, 1995; Doolin, 2004), the link between power relations and IT (Doolin, 1998; Brooke, 2002; Introna, 2003; 2001), and IT resistance and technology failure (Avgerou & McGrath, 2007). [8] However, no IS research has applied Foucault's theorisation of power and human subjectivity (Willcocks, 2004).

Subjectivity in the IS literature usually refers not to human subjectivity but to 'interpretation of subjective meaning' (Narock et al., 2012, p. 180), for example, the inability of a single-context, single interpretation system to be open for meaning in a growing inter-organisational context (Schultze, 2000, Narock et al., 2012, Mingers & Standing, 2018; McKinney & Yoos, 2019). In contrast, our interest in this paper is on the production of human subjectivity in everyday social practices (Siles, 2012), that is, a human actor's individual identity and self-perception and its relationship with structures of power that is shaped in everyday life. This is

because an understanding of the circulation of power in routinised social practices and its effect on human subjectivity can help us understand the conditions that enable digital inclusion or exclusion of human actors.

Our research question is as follows - *how does digital adoption interact with power structures and impact the subjectivity of individuals in the processes of digital inclusion?*

In the next section we will further explore the Foucauldian conceptualisation (1982) of the subject and power, which will be used to reveal the complex relationship between technology and human subjectivities and its impact on CHWs situated in existing power structures of the primary health care system.

3. Theoretical Perspective: Foucault and 'Technologies of Power'

To recap, we start with the conception of digital inclusion not as digital access or participation, but digitally enabled empowerment (Díaz Andrade & Doolin, 2016; Iivari et al., 2018), i.e., the integration of individuals in formal and informal institutions and social life with a sense of self-efficacy, respect, and agency. However, we believe there is no simple or linear connection between digital adoption and empowerment. Empowerment often occurs simultaneously with disempowerment (Pandey & Zheng, 2019). Digital inclusion is thus a contested and dynamic process entrenched with power relations. To analyse and reveal the complexity of digital inclusion, we turn to Foucault's theorisation of power and subjectivity.

Foucault (1977) states that power is omnipresent, i.e., it is found in all social interactions. It is interwoven with and revealed in all kinds of social relations of everyday life. Power not only

has a repressive function but also plays a positive role, in that it also enables actions or capacities of human actors i.e., creates subject positions (Lynch, 2011). In his analysis of power, power is seen as something that enables the identities of human actors, but also limits them, and these two actions inseparably constitute power (Foucault, 1980).

This paradoxical effect of 'technologies of power' is part and parcel of his concept of governmentality. Government according to Foucault (1977) refers to systematised regulated and reflected modes of power (a 'technology') or a discursive field in which the exercising of power is rationalised (follows a specific reasoning) (Hindess, 1996, p. 106). This reasoning defines the fulfilment of human action and the means to achieve it. In other words, technologies of power are social mechanisms, techniques, and procedures for directing human behaviour (Foucault, 1997, p. 68). It is structuring the possible field of action of others, by employing laws or tactics or both, to arrange things in such a way that the means and ends can be achieved in a particular manner by human actors (Rose et al., 2009; Lemke, 2002; Hindess, 1996).

On the other hand, the exercise of power can be instantiated only if the subjects have a certain degree of freedom. Only if there is room for possibilities in which human actors can act, react, or behave in different ways, can power be exercised to limit it (Lorenzini, 2018). Thus, by structuring the field of action of human actors, governmental mechanisms of power, in

particular, also shape the actor's relations to themselves and others. In doing so, human subjectivity becomes something not that is pre-given, and outside of socio-cultural norms and values, but something that is socially, culturally, and historically constituted (Heyes, 2011).

Human subjectivity (creation of identities, and self-assessment of those) then is both individualised in nature but also subject to control. Foucault's 'subject' imbibes two meanings – to either be subject to someone else through control and dependence, and to also be tied to one's own identity by conscience or self-knowledge (Foucault, 1982) - '[b]oth meanings suggest a form of power which subjugates and makes subject to' (p. 781).

Thus, subjectivity is not an essentialist or fixed sense of the self, but continuously performed in practice. Such a perspective is aligned with that of the practice theory and the perspective of performativity well known in the IS literature (Bourdieu, 1977; Feldman & Orlikowski,

2011), which sees social life as emergent and constituted in day to day social practice which in turn shapes human agency and subjectivity, even though the latter is rarely the focus of practice-based studies in the IS literature.

Governmentality illuminates the entanglement between practices of domination and self-formation (Foucault, 1993). Human actors are made docile and useful through numerous vectors of disciplinary practices and management, such as those implicated in systems of education, medicine, military etc., that they engage with in everyday life, whilst also retaining the ability to self-assess and be self-responsible for their actions that are largely governed by the very same disciplinary practices (Lemke, 2002). Human actors then become both 'autonomous agents' and as 'clients to be administered' (Dean, 1994, p. 166). Thus, self-motivation and self-responsibilisation are integrated into structures of domination and

coercion. Therefore, it is not possible to study technologies of power without an understanding of the rationality or reasoning underpinning them (Yates, 2002; Foucault, 1997). From this perspective, we are led to ask how human actor's embody certain subject-positions (made subjects and subjugated to), how are they positioned as subjects? According to what reasoning (rationality) are they situated in social relations or power with others? (Yates, 2002)

The above discussion illustrates what we mean when use the term 'power' and its relationship with the 'human subjectivity'. Through the case study, we seek to reveal how technology (in the form of mHealth adoption) simultaneously produces and reproduces CHWs' human subjectivity and its governing power structures in the processes of digital inclusion. The next section presents the case background and methodology.

4 Methodology

4.1 Background: mHealth and Community Health Worker Processes in India

Community health workers in India build bridges between the formal health systems and rural communities, working to improve the relevance, acceptability, and accessibility of formal health services. Functions of CHWs include conducting home visits, collecting health information about the community/village members, reporting the health information to the local health centres; assessment and preventive treatment of disease; education and counselling and referrals for further care (Lehmann & Sanders, 2007; Braun et al., 2013). With their links to the health system, CHWs can also offer an entry point and, at times,

directly provide health services, such as contraceptive methods, home-based care for people living with AIDS and community-integrated management of childhood illnesses (Lehmann & Sanders, 2007; Ruton et al., 2018).

Community health workers are mostly rural housewives or young women enrolled into primary health care either as unpaid volunteers or low level, community-based health workers. They usually do not have other employment opportunities outside the household. The greatest value of the CHW lies in the fact that they reside in the very communities they serve. Typically, CHWs share the same linguistic, ethnic, and cultural background as the beneficiaries (Agarwal et al., 2015). Once trained, CHWs are able to build trusting relationships with communities and share health information within their communities using culturally acceptable and understandable methods (Agarwal et al., 2015; Bonnell et al., 2017). This adds a moral dimension to community health work (Hampshire et al., 2016), where CHWs feel a sense of altruism and social responsibility. For instance, Prince and Brown (2016) describe that the implicit requirement for CHWs in East Africa is to "demonstrate a commitment to community development underlined by selflessness and the dedication of free labour". Such institutional rhetoric arguably then "shapes CHWs own political subjectivities, motivations, and capacities" (Maes, 2014, p. 108).

Evidence has also shown that even though the CHWs have been viewed as an important component in primary healthcare, they do not always receive adequate political and institutional support (SOCHARA report, 2005; Som, 2016). This is reflected in issues such as the lack of training and supervision, poor compensation, shortage of institutional funding,

changing managerial and political rationales, and so on (Early et al., 2019; Ruton et al., 2018; Agarwal et al., 2015; Braun et al., 2013).

CHWs are often expected to take on extreme workloads, resulting in delays and errors in data collection and slow response to emergency cases, which incur blame and pressure from the PHC centres. In that sense, health workers in their everyday workflow enact more than one subjectivity towards their role. On the one hand, there is an aspect of selflessness and care in providing health care to communities whilst on the other hand, there is a sense of compelled compliance with the duties and workload imposed upon them.

mHealth research has shown that the introduction of mobile phones or tablets within CHW practices help improve the efficiency in the workflow and the quality of health service

delivery (Nyemba-Mudende & Chigona, 2018). Indian examples such as ICTCCS in the state of Bihar (Carmicahel et al., 2016) mSakhi in Maharashtra (Patel at al., 2019), ImTecho In Gujarat (Modi et al., 2017), ReMind in Uttar Pradesh (Prinja et al., 2018), CPHM in Karnataka (Naik et al., 2020) and MfM in Jharkand (Ilozumba et al., 2018) are some of the mHealth interventions that are managed through governmental partnership with NGOs, where CHWs use mobile communication technologies in the form of smart phones and/or tablets to collect and report health data from their villages which is then fed into the governmental HIS (health information system) platform through the PHC centres.

mHealth applications often produce a mixed impact on the work of CHWs. For example, the ICTCCS mHealth application improved the efficiency and timeliness in providing prenatal and antenatal care to the community yet exacerbated existing coordination problems amongst the CHWs (Carmichael et al., 2016). Other issues include hardware, poor infrastructure, and the lack of training (Ilozumba et al., 2018). Moreover, these issues make it difficult for CHWs to focus on the more social and altruistic aspects of their work such as having meaningful health related communication within their communities.

The combination of both social and infrastructural barriers questions the very relevance of mHealth interventions. Schoen et al., (2017) suggest that a qualitative inquiry into CHW and mHealth research is needed to understand the various social factors that act as barriers for successful mHealth adoption by CHWs. In addition, what is also required is a clear theoretical perspective in both systems design and CHW-mHealth research to understand the acceptability and usability of mHealth programs within CHW work practices (Ilozumba et al., 2018).

4.2 Research Site

The PHC centre where this study was conducted is located at the foothills within the Chamrajnagar district of the southern state of Karnataka, India. It has a relatively high population of indigenous people, e.g., Soliga tribal population, who have lived in and around the thickly forested and hilly areas for centuries, and is one of the worse-off districts with respect to health and development (Seshadri et al., 2019).

The PHC centre in this area is managed through a public private partnership model, where the state government of Karnataka, in collaboration with a local non-governmental organization (NGO), is responsible for the provision of the required human resources and logistics to

deliver preventive, promotive, curative, and rehabilitative health care services (Nayak, 2010; Prasanth, 2011). The NGO and the government, employs health workers, who are categorised in various tiers – tier 1, 2 3, and their functions include going on field visits, performing ante-natal care (ANC) registration, educating expectant mothers about maternal health and children on hygiene, following up each patient throughout their pregnancy until delivery, and following up on child immunisation (Karun Trust Annual Report 2019-20). The PHC centre consists of medical rooms, one medical officer, one administrator, one dentist, one block health education officer, four staff nurses, one pharmacist, one laboratory technician, a supervisor, four tier 1 CHWs, six tier 2 CHWs, 4 to 5 tier 3 CHWs and two male health workers (MHWs) (Karuna Trust Annual Report 2019-20).

Despite the integration of the PHC system into the communities, much of the rural population continued to suffer from acute chronic diseases and did not primarily depend on PHC due to their existing faith in traditional medicine and health practices. Living in the hills, many community members found it costly and inconvenient to travel to the PHC centre. Hence, health workers became pivotal in providing this population with preventive services and for linking them with the PHC centre. In 2015, an mHealth device (android tablet) was provided to the community health workers to improve their existing workflow which is the focus of our study.

4.3 Data Collection

Data was collected by the first author between January and February in the year 2016. This data collection process was grounded in an interpretive and qualitative approach towards unpacking the impact of the mHealth intervention on the subjectivity of the CHWs. The research phenomenon here is the regular engagement of the CHWs with the mHealth technology and how it shapes the experience of CHWs as embedded in existing social relations and institutional norms. Thus, the data collection includes not only the CHWs but also a diverse set of relevant social actors to capture the interpretations and social relations of all the actors associated with the phenomenon.

Data collection methods included semi-structured interviews with the tier 1 and tier 2 CHWs, an mHealth engineer, and the PHC supervisor. A focus group interview with community members was also included. Finally, participant observation of tier 1 and 2 CHWs was conducted during their routine workflow. The researcher was able to record and investigate

the day-to-day engagement with the technology by the CHWs, alongside their interactions with the community members and the PHC staff, which generated insights of the power dynamics between the PHC staff and CHWs, and CHWs and community members.

Semi-structured interviews started with broad open-ended questions to understand what CHWs, the PHC supervisor and the mHealth engineer generally felt about the technology and its impact on their workflow, and slowly moved on to more specific questions where they could expand on their insights a bit more. The questions slightly differed depending on how

strongly associated with the technology the participant was (i.e., CHWs emphasised more on how they felt about using the technology, i.e., feeling confident or burdened, versus the PHC staff who focused more on the efficiency aspect of the technology use, for instance, improved data collection and surveillance). Interviews of the CHWs were conducted during the observation phase. Due to their busy workload, it was not always possible to detach the CHW for long periods of time for an interview. The interview duration depended on the availability of free time of each of the CHWs during their routine work tasks. Table A1 in the Appendix presents the general field observation guide; A2 provides the list of the interviewees and the duration of their interview, whereas A3 includes the interview protocol.

Lastly, a focus group study was conducted which included 15 community members. The focus group consisted mostly of beneficiaries (pregnant women, women with infants, with a few husbands, and some of the village elderly). The purpose of the group discussion was to observe if the community members felt a change in how the technology was impacting the ability of the CHWs to deliver the health services to them (Ritchie & Lewis, 2003). The group discussion also helped develop a rich picture of the social context within which the phenomenon was experienced. Community members are an essential part of the phenomenon, as they are at the receiving end of the health services which are delivered by the CHWs. Any change in the quality of the health services (e.g., improved emergency case management) was directly attributed to the CHWs, who in turn attributed it to the use of the

tablet.

Together, these three sources of data demonstrate the multiple perspectives on mHealth adoption and its entanglement with CHW work practices in this specific context.

4.4 Analysis of Data

The data analysis moved between a deductive and inductive approach (Trochim, 2006; Creswell, 2013). The researcher went into the field with *a priori* assumption that the mHealth application served as an empowering tool. However, the data collected revealed a rather different pattern from the assumption. Thus, data analysis involved taking a step back and starting an iterative process between data and the literature to find a suitable theoretical lens. Through a long period of exploration and discussion, Foucault's concept of the subject and power (1982) was adopted to examine human subjectivity as embedded in power relations.

Using thematic analysis (Braun & Clarke, 2006), the dominant theme that emerged was the simultaneous empowerment and disempowerment of CHWs. We followed the phases of thematic analysis: familiarising ourselves with the data, generating initial patterns, searching for themes, reviewing themes, naming themes, and finally building the construct (Braun & Clarke, 2006). Field notes were used to cross-reference the themes emerging from the interview transcripts and to juxtapose the health workers' accounts with the accounts given by the PHC staff and the community members.

Two themes were generated from the data analysis: 'empowering the subject' and

'reproduction of power'. Table A4 in the Appendix shows examples of the open, selective, and theoretical codes, as well as corresponding quotes. Selective codes such as 'Streamlining of data collection and reporting processes by the CHWs', 'improved relationship between the CHW and the PHC centre', 'changing perceptions of the CHWs by the PHC staff', and 'changing perceptions of the CHWs by the community members' helped us analyse human subjectivity. CHWs started to experience acknowledgment and visibility by their immediate network of people that was previously lacking. An enhancement in the sense of self, albeit derived from their network of power relations, helped address the complex aspects of inclusion. On the other hand, selective codes such as 'increase in monitoring and surveillance of CHWs', 'CHWs experiencing lack of institutional support' and the 'change in power dynamics between tier 1 and tier 2 CHWs' helped us analyse aspects of continued control and domination of the primary health system over the CHWs. The state's governing system was further strengthened by the monitoring and surveillance capabilities of technology, thus, reinforcing CHWs' perspective of being treated as a point of blame, consequently generating a sense of exclusion.

5. Case Study

The traditional method of data collection and reporting on maternal and child health, such as ante- and post-natal care registration, childbirth, and immunisation registrations, and follow up on treatments, would entail the tier 1 CHWs to manually write and record data in paper-based registers. Each health worker would be allotted a set of household visits to conduct within their given radius. The health workers, during these house visits, would have discussions with the beneficiaries about their health, ongoing treatments, birth/maternal registration and follow ups. They would manually fill the required health information into the register. Sometimes each CHW would conduct 20-30 household visits in a day and the data would have to be entered in 25-30 registers. The data would then be reported to the local PHC centre at the end of the week. Frequently, this would be difficult for one health worker to do alone so tier 2 CHWs would assist them with it. The process was thus labour intensive, time consuming and stressful, often leading to delays and errors in the data. In the management of emergencies, it proved to be especially problematic as the PHC centre would be ill prepared to provide the right kind of treatment or care, sometimes even resulting in patient mortality. These systematic problems would be attributed to the failures of CHWs, thereby damaging their credibility among the PHC staff and in the communities.

In 2015, an mHealth intervention, i.e., an android tablet, was launched to assist and streamline the health worker's workflow. The tablet was mainly used by the tier 1 CHWs and a few tier 2 CHWs who assisted them, prioritising maternal and child health services. The device supported: storage and retrieval of information; a smoother interface to feed in and view the data; syncing the data from the tablet to the computer systems in the PHC centre; automatic collation of data through the inbuilt software; GPS functionality and a reminder system.

5.1 The Power of Subject Making

5.1.1 Higher Level of Self-efficacy

The introduction of the tablet considerably streamlined the work processes described above. The tablet hosts an inbuilt software that contains various technical features to assist the health workers in filling the data systematically, which is automatically collated by the tablet software. The tablet is also amenable to being physically carried to different households with all the information at hand. These changes had an inadvertent impact on the relationship between the health workers and the PHC staff.

After the intervention of technology, the PHC supervisor was noted as saying -

"although we always trusted the judgment of the health workers as they are the ones who directly interact with the community, but due to the poor data quality it was difficult to take their judgment on the beneficiaries seriously…the data was of poor quality because of them… the registers would be filled with mistakes and delays...

But today they are the primary users of the tablet and are also the ones who put the data in it which is then reported to us. This improvement in reporting has increased our trust on them, the data has less errors and as soon as the tablet catches mobile connectivity it syncs the data

into the PHC centre computer system."

When asked about this change to the health workers, they responded by saying, they felt happy *(khushi)* with this change in perception by the PHC staff. They feel that they are relied on for their feedback, as they are the ones who manage the data that is fed into the tablet. They feel important because they are included in the conversations that the PHC staff have about the critical beneficiaries of the village. Jaya and Kiran were noted as saying –

"The PHC staff take us more seriously now, and sometimes the PHC staff now even ask for our opinion, especially when it comes to certain serious cases. They ask our opinion when they are going through the beneficiary information that has been put by us in the tablet".

Thus, by being able to contribute opinions, CHWs are able to showcase their knowledge, gained from the field, on how to help critical beneficiaries. Previously, before the intervention of technology, CHWs were overburdened with the data collection and reporting tasks, which would often prevent them from having meaningful health-related conversations with the community members. Better communication with the beneficiaries helps the CHWs gain knowledge about the health-related situation of the community, which is put to use when the PHC staff ask for the CHW's opinion, and they are able to provide it.

Furthermore, community members also attributed to the CHW improvements with reference to the distribution of pregnancy benefits provided by the government to maternal beneficiaries of low-income households in the country. Previously, there had often been misallocations in allotting the correct pregnancy benefit to the recipients by village committee members. But today, this issue has also been considerably streamlined. In the focus group conversations, some committee members were noted as saying:

"Since the introduction of the tablet, the CHWs have started to give us better quality information about the beneficiaries. This has had a direct effect on the scheme allocation.

Initially because we didn't have much information or CHWs provided us incorrect information, it would make it difficult for us to allocate the right scheme to the right person.

But today the process of scheme allocation has become much more streamlined, as we now receive accurate information from the CHWs."

5.1.2 Increased Appreciation & Altruism

Previously, the CHWs were in a vulnerable social position because the PHC staff, by virtue of their hierarchical superiority, would attribute the mismanagement of the data to the incompetency of CHWs. Additionally, the community members would also express their dissatisfaction, and blame the CHWs for their inability to fulfil their health-related needs.

With the introduction of mHealth devices, the automatic collation feature of the tablet helped in improving the response time of managing high-risk pregnancies. The in-built feature of the tablet would automatically collate the data and start beeping red if it recognised that a beneficiary was identified high risk and in need of immediate assistance. Upon receiving this notification, the health workers would alert the PHC staff by calling them from their mobile phone. Additionally, when there would be good mobile connectivity, the tablet would also automatically sync the information into the PHC computer systems.

The improvement in the management of the emergency cases has aided in reducing the blame

aspect. Thus, CHWs who had previously felt that their hard work was not recognised, now felt less excluded and more appreciated. CHWs now felt that their hard-work and knowledge in the field had become visible in the eyes of the communities and PHC staff, as compared to before. These changes have made CHWs feel an increase in their confidence level and self-efficacy, which has made them feel closer to their altruistic self, i.e., being able to nurture health-related change in their communities and preventing the deaths of critical patients. One of the tier 1 health workers, Bhavna was noted as saying -

"We feel driven to do our job now. Before, even the community members would blame us for not being able to deal with emergency situations. There would be a lot of confusion and we would be seen, as not being capable of doing our jobs. But today we have more confidence when it comes to dealing with emergency cases. We feel happy to be able to serve our community, prevent deaths, and get appreciated for it".

5.2 The Power of Subjugating

Despite the positive effects of technology, there were several instances recorded where technology also reinforced existing inefficient processes that translated into negative effects for the CHWs.

5.2.1 Increase in Workload

Infrastructure issues and fear of accountability caused an overall increase in the workload of the CHWs. Mobile connectivity is a key aspect that is necessary to enable the data from the tablet to be remotely synced to the PHC centre computer systems; having

enough battery charge on the tablet enables the CHWs to smoothly go about their remote data collection and reporting process. In practice however, these technical advantages translated into technical issues. For instance, every time the tablet ran out of battery charge or the internet data allowance, the health workers would be required to travel back to the PHC centre to sync the data with the PHC computer systems or to charge the tablet. This rule was mandated by the PHC centre in order to maintain the quality, longevity, and the correct utility of the tablets. As the Chamrajnagar district is a rural and tribal area, electricity issues are prevalent. Thus, health workers would have to frequently return to the PHC centre located in the foothills which disrupted their workflow and caused delays. Jaya (Tier 1 health worker) was noted as saying,

"During busy periods, it becomes quite tiring to go all the way back to the PHC centre to sync the data or charge the tablet, especially when I am in the middle of collecting beneficiary information. Sometimes the tablet would have to be left there overnight for charging which means I would have to travel all the way to the PHC centre in the morning to pick up the tablet before I start my day".

Moreover, the workload was further increased when tier 1 health workers were burdened with new tasks aligning with the intervention of technology. Health workers were asked to collect beneficiary identification information (IDs) in order to maintain a digital repository of the village members IDs. Binita and Kiran explained,

"You see we were also going from one house to another to collect their identification information. So now if someone loses their ID card or forgets to get it to the PHC or subcentre, they can still come and get treated as their identification information is digitally recorded".

This process of doubly collecting information in addition to their existing responsibilities made their routine workflow even more time consuming and cumbersome. Especially as many community members were reluctant to give their individual or family information. Health workers also feared liability from the loss of data. If the tablet had a hardware issue, the data would be lost and the CHW would be held responsible for it by the PHC centre. Thus, this led to double data collection (paper-based and tablet-based), i.e., CHWs would have to enter the data in both registers and tablets simultaneously. Albeit health workers preferred using the tablet as it was easier to carry and afforded automatic collation, they (Jaya, Binita, Bhavna, and Kiran) complained about feeling overburdened –

"Initially we had to only collect the information from our routine house visits. But since the use of the tablet our workload has increased! We have to take all the existing information from the registers and transfer it to the tablet, to also continue to doubly collect data in both registers and tablets, and finally to also collect the beneficiary identification information to maintain the digital repository of the IDs of the beneficiaries! Too much work."

The fear of data accountability supplemented by technical issues further reinforced the existing problems leading to health workers feeling more disempowered than before.

5.2.2 Heightened Surveillance

The notification feature and the implementation of an electronic dashboard at the PHC centre subjected the health workers to further scrutiny. Should a health worker forget to complete the tasks or was running behind schedule, the tablet would send them a reminder and the PHC staff would be able to monitor the progress of the health worker's task completion. The health workers had mixed feelings about this. Some said that the notification feature was useful in reminding them of forgotten tasks, such as timely immunisation visits. Others felt uncomfortable with being monitored during their routine work processes and wanted the space and freedom to do the tasks at their own pace and discretion. For instance, due to the institutional rules and norms adhering to tablet use, health workers were compelled to do the house visit when the tablet reminded them to, or visit the PHC centre when the tablet ran out

of battery. This was further supplemented with an increased monitoring of their activities through the electronic dashboard. Some health workers now worked under pressure because they were fearful of being held accountable and losing their jobs. Binita and Bhavna commented,

"What is this, our routine job of conducting house to house visits is hard as it is, and now we are being watched! We would like our freedom to do our tasks when it is suitable for us. We have other responsibilities as well like taking care of our children and husbands or doing our

own household work."

Structurally and institutionally, the health worker role does not permit them to question the legitimacy of technology use. Therefore, they become docile users of technology and do what the technology directs them to do, even if they find certain aspects of it inconvenient. Their existing subservient relationship with the PHC centre discourages them from raising any complaints or showing resistance towards the rules adhering to technology use. Thus, they normalise being overburdened as part of their work routine. In this situation, technology becomes a medium to reproduce the PHC system's control over the CHWs, undermining the CHWs' autonomy and flexibility in their everyday workflow which they were previously entitled to.

5.2.3 Exclusion within CHWs

The primary healthcare structure in India specifies an official hierarchy of health workers consisting of three cadres of health workers (Scott et al., 2020). The tier 1 or senior level health workers are recruited by the PHC centre based on their education qualification (whether they completed basic schooling) and are paid a salary. The tier 2 health workers are recruited as volunteers and are paid based on meeting their targets (set by the PHC centre) and operate at the village level. The primary task of tier 2 CHWs is to assist the tier 1 health workers in data collection and reporting and to also sensitise the community on the health, nutrition, and sanitation issues. Tier 3 CHWs primarily educate children on health and sanitation and are generally considered the junior most cadre of CHWs. In our PHC centre,

tier 3 CHWs were not involved in the use of the tablet, as their primary role did not entail data collection and reporting[2] (Scott et al., 2020).

While in some PHC centres the tier 2 workers directly report to tier 1 workers, in others they work collaboratively to deliver the health services to their community (Scott et al., 2019). In the PHC centre where this study was conducted, the tier 2 workers worked collaboratively with the tier 1 health workers, e.g., undertaking certain house visits on behalf of the tier 1 CHWs. However, this collaborative dynamic was negatively impacted by the intervention of technology.

During the implementation phase, the institutional rule (set by the PHC centre) on tablet use stipulated that only tier 1 health workers would be allowed to use it, as they were better educated, experienced, and trained. In cases where the existing relationship between the tier 1 and 2 health workers followed along the lines of sisterhood, the senior health workers, at their discretion, would let the tier 2 CHWs use the tablet thus enabling the latter to continue to assist the former in routine tasks. But in cases, where the existing relationship between the two tiers was more formal and less personal, the senior workers would prevent the junior health workers from using the tablet. As a result, the junior workers felt excluded and unimportant, or in some cases even felt belittled and discriminated. As Yashti and Rajeshri

[2] The role specification of the tiers varies from state to state. Therefore, what was applicable in the PHC centre in this study might not apply in other PHC centres. In a country like India, with 28 different state governments, the responsibilities and use of technology by the different tier health workers varies depending on every state's health program, goals, and mission.

(tier 2 health workers) shared,

"We were the biggest support they (tier 1 workers) had before. The process of filling up 25-30 registers and then reporting it to the PHC centre was not an easy task. Many a times we would relieve them of some of the burden by doing the house visits ourselves and reporting the data to them, who would then fill the register. But since they have started using the technology, they do not involve us as much, they want all the recognition for themselves! We request the supervisor at the PHC centre sometimes, to let us use the tablet as well."

The inclusion of technology in the existing work processes has thus inadvertently led to the exclusion of tier 2 health workers. While this was not reported by all, some tier 2 workers did feel less valued and redundant, and therefore less motivated to perform their responsibilities.

Thus, the introduction of the technology to some extent reinforced and formalised the hierarchy amongst health workers leading to the exclusion of some.

5.3 Analysis: The Subjugation and Subject Making of CHWs

The above case of mHealth adoption reveals why digital inclusion as empowerment may be problematic and contested. From a Foucauldian perspective, the human subject is both tied to ones' own identity but also subject to control and dependence. The mHealth application shaped the subjectivity of the CHWs embedded within the system of power and reconfigured their positionality and experience of being simultaneously empowered and disempowered, or simultaneously included and excluded, in the PHC system.

The intervention of technology triggered a change in the dynamics of the CHWs' network of

social relations. Due to the streamlining of the CHW's work processes, they received more respect than blame from the PHC staff and community for their contributions to the health and wellbeing of the community. Consequently, making CHWs feel psychologically empowered and motivated to perform their routine tasks as a health worker of the community. Technology as enacted in CHW's daily practices engenders a sense of responsibility through the changed perceptions of the very actors (social relations) that originally reduced them to a point of blame and exclusion. In a Foucauldian sense, the self-motivation and self-esteem regarding their CHW role was enhanced through the use of technology.

However, the very same technology also reinforced a sense of powerlessness and subjugation of the CHWs. The mHealth application reproduced the existing hierarchical relationship and strengthened the disciplinary control over the CHWs (Foucault, 1977), through real-time surveillance and tracking by the PHC centre. Therefore the CHWs' sense of autonomy is also significantly restricted by the very same disciplinary control (Rose et al., 2006) which is further supplemented with the lack of institutional support. The digitisation of data collection and its visible benefits also legitimises the excessive workload of data collection added to the CHW's daily workflow at the expense of their wellbeing and personal lives. Meanwhile, a digital divide emerged between Tier 1 and Tier 2 CHWs, leading to the exclusion of the latter, and undermining the existing sisterhood among CHWs. Thus, the heightened sense of

autonomy and responsibility is incorporated into the institutional structures of domination of the PHC centre.

From the perspective of Foucault's governmentality (Burchell et al., 1991), the technology artefact is entangled and enacted in the CHWs' network of power relations, which normalises control and discipline by the PHC centre, while also fostering self-motivation by injecting new meanings to the job role of the health worker. The analytical lens of subjectivity and power reveals how technology shapes the reconciliation and tensions between individual efficacy and the domination of power.

To summarise, the empowerment of individuals takes place within existing systems of domination and control and occurs simultaneously with disempowerment. This paper thus makes contributions to the literature on digital inclusion by providing a more granulated analysis. In the rest of the section, we will discuss the contributions and implications of the study to both theory and practice.

6 Implications for Digital Inclusion Research and Practice

6.1 Linking Power, Technology, and the Subject

There is a general neglect of power in understanding digital inclusion in most IS research. In this study, Foucault's analytics of power is used to explore the constitution of human subjectivity as part of digital inclusion. Foucault has been often applied in IS literature to study surveillance and power (Lyon, 1994; 2003; Doolin, 1998; 2004, Brooke, 2002; Introna, 2001; 2003). However, this paper offers a novel example of applying the Foucauldian conceptualisation of the subject and power to examine how everyday production and reproduction of power can affect human subjectivity (Bloomfield 1995; Markula, 2003).

As subjectivity is constituted in an individual's day-to-day practice, the mHealth case can be seen as a type of technology-in-practice (Orlikowski, 2000) embedded in the PHC procedures and processes, and enacted in the day-to-day practices of the CHWs, thereby shaping their subjectivity as an active member of the PHC and local communities. It is through the integration in routinised practice that digital systems acquire the power of governmentality, namely not necessarily in relation to the state apparatus, but in terms of 'directing souls' and shaping conducts (Lemke, 2002). In this case, mHealth relays and reproduces the hierarchical power of PHC which subjugates the CHWs by normalising a higher workload, constant tracking, and monitoring, and differentiating levels of digital skills among various tiers of CHWs.

In contrast, the mHealth adoption also effects the subject making of the CHWs, i.e., generating a sense of empowerment. In this case, the mHealth application appealed to their sense of altruism, self-efficacy and self-responsibility, which differentiates from the usual association of *governmentality* with neoliberalism that seeks to promote individuals' sense of autonomy and self-management (Lemke, 2002b; Rose et al., 2006; Moisander et al., 2018).

Nevertheless, the mHealth application enacts a mode of power that simultaneously subordinates and produces subjectivity (Mackenzie & McKinlay, 2020). Such a perspective puts emphasis on the relationality of human subjectivities which paves a pathway to

understanding the complex positionality of the human actor as embedded in everyday social processes that are shaped by multiple power dynamics. Technology is placed at the crux of the contradiction between individual subjectivity and power structures.

In this study, we observe how individual empowerment occurs despite the reproduction of disciplinary power, but there was no evidence of critical awareness on the part of the CHWs, with regard to the structural limitations on the self that could be indicative of individual resistance or destabilisation of power structures (Raffnsøe et al., 2019). In other words, CHWs are to a certain extent included and empowered as more effective, trusted, and respected actors in the community and the PHC system, but not to an extent where they can be considered as agents of change or even in creating possibilities for 'self-formation' (Munro, 2014). This simultaneous facilitation of disempowerment and empowerment in digital inclusion is rarely explored within the IS literature.

6.2 Digital Inclusion as Empowerment

As reviewed earlier, the IS literature on digital inclusion dominantly interprets the concept as either providing digital accessibility or social capital for community participation. By adopting a perspective of digital inclusion as empowerment, this study advances the existing discourse on the relationship between technology and social inclusion by integrating the dimensions of power and human subjectivities from a Foucauldian perspective. Illuminating the various digitally mediated subjectivities helps us understand that human actors are always positioned at the intersection of various power relations with heterogeneous institutional norms, rules, and rhetoric, which explains why and how digital inclusion and exclusion often simultaneously occur in a given context (Trauth, 2017; Zheng & Walsham, 2021).

This study specifically contributes to digital inclusion research that conceives inclusion as (a contested process of) empowerment, in other words, individuals are included not only as users or participants, but also as actors with a sense of agency and autonomy and the ability to make a difference (Baron & Gomez, 2013; Díaz Andrade & Doolin, 2016). Empowerment is multidimensional in nature. It is relational, transformative and encompasses various categories both at an individual level and at broader structural levels (Zimmerman, 1995; Alsop & Heinshohn, 2005). Thus, in our case, we observe CHWs being psychologically empowered but not institutionally so. A detailed analysis of the subjectivities of CHWs presents a more nuanced and qualified view of inclusion as empowerment, where inclusion and empowerment are made possible within a larger project of governance with fostered dominance and control. Digital inclusion here means not only a higher level of visibility, recognition, and respect in the community, but also the increase of confidence and self-efficacy. However, at a systemic level they are even more restricted than before due to technology's enmeshment within existing rules, norms, and practices, which sheds light on why the fourth level of digital inclusion (structural transformation), where participants become agents of change, is difficult to achieve.

By seeing technology users as social actors situated in power relations, we highlight the impact of technology in everyday life. It is in everyday life that human actors through their actions reproduce social structures, in which are embedded social norms and relations that govern their very being (Orlikowski, 2000). From such a perspective, a more granulated and

practice-based understanding can be derived in relation to digital inclusion, as opposed to a top-down, category-driven understanding of technology's interaction with its users. In other words, it addresses the *how* question rather than the *who* question and moves beyond a binary opposition of digital inclusion and exclusion.

6.3 Implications for Practice

What are the implications of this discussion for public policy and practice? Firstly, digital inclusion takes place at multiple levels, therefore both the public and academic discourse should not only be based on demographic categorisation of social groups, for example, gender, age, disability, and so on, but also on the processes of inclusion where power structures are inevitably engrained. Digital inclusion is therefore more complex and dynamic than providing infrastructure, skill-training, and participation. By centring power and subjectivity in the discussion of digital inclusion, we echo the suggestion of Zheng and Walsham (2021) to treat the included not as *users* of digital technology or a passive recipient of assistance, but as *actors* positioned in a network of power relations, and whose sense of subjectivity is valued.

In some cases, top-down initiatives of digital inclusion are limited to integrating people into a digitalised system to improve its efficiency, while reproducing and reinforcing existing institutionalised power structures (Pandey & Zheng, 2019). This may give rise to the instrumentalization and subjugation of individuals. Instead of seeing individuals as 'users' or 'recipients', they could be considered as active, reflective actors embedded in structures of norms, values, and power relations (Pandey & Zheng, 2023). Digital design and policies may also serve the emancipation and empowerment of individuals, that goes beyond merely providing access to technology.

Importantly, this takes us to move beyond the question of *'who is included'*, but *'how they are included and under what terms?'* For instance, when looking at social inclusion of women in the work force, even in countries where women enjoy the best employment opportunities, many women are still paid at a lower rate than men for the same type of work or have to endure a highly masculine organisational culture (Stamarski & Son Hing, 2015; Padavic, et al., 2019). Similarly, when it comes to digital inclusion, while the digital economy has facilitated social inclusion of the disadvantaged and marginalised populations by lowering participant thresholds and transaction costs, these very systems are still entangled in existing power networks and tend to reproduce or exacerbate offline social inequalities, e.g., by putting workers under surveillance, exploitation, and precarious work conditions (Greenwood et al., 2017; Malin & Chandler, 2017; Zheng & Wu, 2022). It is for this reason that a focus on human subjectivities adds value by offering a more sensitising perspective in the discourse of digital inclusion.

For policy makers, digital designers, and facilitators of digital programs, it may be important to consider the objectives and social conditions against which digital inclusion is implemented. Integrating the users of technology in the technology implementation process or engaging continuous feedback from the users on their use of the technology, can help engineers and designers better understand the social implications of technology on the everyday life of the users.

Finally, it would benefit digital inclusion researchers and practitioners to adopt qualitative and ethnographic methods of data collection. Development program evaluators tend to rely on their own judgements to what is of value, then to understand it from the recipient's perspective how spaces of inclusion or exclusion are being created for them (Kabeer, 2005; 2001; 1999). By adopting a qualitative research design, we were able to investigate the aspect of digital inclusion and exclusion from people's own retrospective narratives. Interviews, and field observations were pivotal for us in understanding the subtle process of the duality of empowerment and disempowerment that was facilitated through technology for the CHWs.

Thus, a qualitative research design helped capture the subjective perspective of digital inclusion and exclusion.

7 Conclusion

This paper presents a case study of how an mHealth application facilitated inclusion of CHWs within the system of power of the PHC system. The dual effect of empowerment and disempowerment was only made visible by recognising how processes of inclusion were rooted within the power structures of the context that governed the social relations and subjectivity of the CHWs. The paper provides a sensitising perspective to differentiate diverse connotations of digital inclusion, from accessibility and or participation, to empowerment and agency for change, and various mechanisms that reconfigure the practice and implications of inclusion and exclusion at the same time. Furthermore, we propose a conception of digital technology as 'technologies of power' and constitutive of governmentality, which entails a complex relationship between power and human subjectivity. Such a perspective enriches and deepens our understanding of digital inclusion as a political process that is dynamic and contested.

The study is limited in that it does not explicitly or extensively investigate the role of gender as entangled in CHW's subjectivity and work. Although some aspects of this are reflected in the findings, for example, the fact that they are obligated to carry out household tasks and respond to the needs of family members at various times of the day, in parallel to their devotion to their work as CHWs. Instead of using any gender-based perspective, we draw upon Foucault (1982) to focus on the importance of the subjectivity of health workers that is produced and reproduced in their everyday practices on processes of digital inclusion. Technology can assist human actors by providing a higher level of self-efficacy and sense of agency, thereby achieving psychological empowerment at an individual level. However, such empowerment does not necessarily challenge existing structures of power or transform one's position within the dominant system of power.

Future studies on community health worker practices could adopt a gender-based perspective to study how they navigate spaces of inclusion and exclusion as rooted in gendered power structures. For instance, does the CHW's relationship with her mother-in-law or husband, impact the way she carries out her work? And does this add a new layer of exclusion for her in her everyday work? Furthermore, moving beyond the context of this paper, we also encourage future research to examine the issue of intersectionality in digital inclusion (Dy et al., 2017; Zheng & Walsham, 2021). How does being positioned at the intersection of various

systems power impact a human actor's ability to be included? And what role does technology play in it?

Lastly, it would also be interesting to conduct longitudinal studies to investigate whether the adoption of technology and the related enhancement of self-efficacy and responsibility could, over time, lead to some level of critical awareness of participants in terms of social structures and plant the seeds for broader possibilities of change in policies and institutional arrangements. This level of analysis would contribute to the fourth level of inclusion that looks at structural transformation.

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Appendix

Table A1: Field Observation Guide

How are the Tier 1 CHWs using technology?

How are the Tier 1 CHWs getting along with using the tablet?

What are the reactions of the CHWs about using the tablet?

How do the community members feel about the use of the tablet by CHWs?

How does the PHC staff feel about the tablet?

How is the communication between the PHC staff and CHWs managed?

What is the relationship between CHWs and PHC staff like?

What is the relationship between CHWs and the community like?

Table A2: Interviewee list and Interview Duration

Interviewees	**Pseudonames**	**Interviewee time length**	**Degree of Interaction with the mHealth tablet**
Tier 1 CHW	Jaya	01 hour: 2 minutes	High
Tier 1 CHW	Kiran	50 minutes: 20 seconds	High
Tier 1 CHW	Binita	01 hour: 15 minutes	High
Tier 1 CHW	Bhavna	01 hour	High
Tier 2 CHW	Sanvi	30 minutes	Intermediate
Tier 2 CHW	Yashti	30 minutes: 3 seconds	Intermediate
Tier 2 CHW	Rajeshri	20 minutes: 2 seconds	Intermediate
Supervisor 1	Nagendra	01 hour: 30 minutes	Intermediate
mHealth Engineer 2	Anita	35 minutes: 30 seconds	High
District Head	Bhavin	01 hour: 05 minutes	None
Beneficiary 1	Aarohi	15 minutes: 34 seconds	None
Beneficiary 2	Hiral	13 minutes: 34 seconds	None

Beneficiary 3	Palak	25 minutes: 30 seconds	None
Beneficiary 4	Meenakshi	25 minutes: 56 seconds	None
Beneficiary 5	Rudrani	15 minutes: 30 seconds	None
Beneficiary 6	Urvi	20 minutes: 45 seconds	None
Village community members	15	01 hour: 15 minutes	None
Total	35		

33 **Table A3: Semi-structure Interview Protocol**

General Interview topic guide for PHC staff
(broad) How do you feel about the Tier 1 CHWs at this centre? How do you feel about the community you cater to? Can you describe the routine processes at the PHC centre? How do you feel about the tablet that is being used by the CHWs? What changes has the use of the tablet bought? What are the major changes the tablet has created? *(specific)* Has the tablet created any changes in the data reporting process of the CHWs? Has the tablet created any changes in the data collection process of the CHWs? How has the use of the tablet impacted your communication with the CHWs?
General Interview topic guide for CHWs

(broad)

For how long have you worked as a CHW?

Do you like being a CHW?

What are your main responsibilities as a CHW?

What is your daily job like?

What are your feelings about using the tablet?

(specific)

Has the health tablet improved the data collecting process?

How did you do your job before you were given the health tablet?

How is the use of the health tablet different from the paper-based system?

How has the use of the health tablet affected your daily routine?

How has the use of the tablet affected your work process?

How has the use of the health tablet affected the relationship between you and the PHC staff?

How has the use of the health tablet affected the relationship between you and the community?

Has the use of the tablet created any major changes for you personally?

Overall, what is your opinion on the use of the health tablet?

The Coding Table is provided on the next page.

Table A4: Thematic Analysis Table

Theoretical Theme	Theoretical Code	Selective Codes	Open Codes	Participant Quotes (Examples)
Subject Making	Feeling a sense of self responsibility and agency as rooted in existing power structures	Streamlining of data collection and reporting processes by the CHWs Improved Relationship between the CHW and the PHC centre Changing perceptions of the CHWs by the PHC staff Changing perceptions of the CHWs by the community members	Reduction in data errors Reduction in data lag Reduction in data loss Reduction in blame on CHWs Improved emergency case management Improved allocation of governmental pregnancy schemes Improved data sharing by CHWs with the PHC centre Timely completion of Tasks Appreciating the role as a CHW, and their responsibility towards the community only when the PHC staff acknowledges it Timely reporting of data to the PHC centre	Bhagya: “we feel more appreciated now for the work we do, the PHC supervisor blames us less” Bhagya: “before when we would collect data in the registers the PHC staff would blame us, for not being able to meet emergency case needs because the data would be filled with errors, but today that has improved” Bhagya: “we feel more appreciated now for the work we do, the PHC supervisor blames us less” (PHC staff) Nagendra: “the dashboard at the PHC centres can now geographically monitor the progress of the CHWs”. (mHealth engineer) Anita: “the reminder feature also ensures that if any CHW is running behind her tasks, she is reminded to do the task”. Village Health Committee Member: “Initially, there used to be huge problems when it came to correctly allocating the pregnancy scheme to the correct beneficiary due to the data having lots of errors and delay, but the improvement in the data quality has helped in the correct allocation”.
Processes of Subjugation	Control and domination over the human actor by their power relations and power structures	Increase in monitoring and surveillance of CHWs CHWs experiencing lack of institutional support Change in power dynamics between tier 1 and tier 2 CHWs	More pronounced division of work between CHWs Collection of beneficiary ID information Dual collection of data in registers and tablets Additional visits to the PHC for	Yashti and Rajeshri: “We were the biggest support they (tier 1 workers) had before. The process of filling up 2530 registers and then reporting it to the PHC centre was not an easy task. Many a times we would relieve them of some of the burden by doing the household visits ourselves and reporting to them who would then fill the register. But since they have started using the technology, they do not involve us as much, they want all the

				recognition for themselves! We request the supervisor at the PHC centre sometimes, to let us use the tablet as

			charging the tablet and syncing the data Increase in additional work for the CHWs Increase in surveillance of CHWs CHWs receiving blame by the community CHWs receiving blame by the PHC staff Following rules set by the PHC on tablet use CHW's obligation towards following the PHC centre's orders CHWs complaining about workload CHWs complaining about not getting time with their families CHWs complaining about not getting time for their domestic responsibilities	well". Binita: "What is this, our routine job of conducting house to house visits is any way hard as it is, and now we are being watched! We would like our space and freedom to do our tasks when it is suitable for us." Jaya: "during busy period, it becomes quite tiring to go all the way back to the PHC centre to sync the data or charge the tablet as there is better connectivity and electricity there ". Kiran: "We are scared that the district officer might blame us if we lose the data, due to some technical glitch, so we collect the data in registers and in the tablet"