Advocacy as Access Work: How People with Visual Impairments Gain Access to Digital Banking in India

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Research in accessibility and assistive technology often assumes that technology is within easy reach, that is, people with disabilities are able to obtain technologies so long as they are accessible. As a result, less is understood about the challenges that people with disabilities face in obtaining technology in the first place and how they work around these challenges. We reduce this gap by examining the technology access challenges of people with visual impairments in India in the context of digital banking. Through a qualitative study consisting of 30 interviews, we find that participants routinely encountered social and technical challenges that made it difficult to access and use digital banking. To address these challenges, people with visual impairments engaged in advocacy work which consisted of five dimensions: 1) creating awareness, 2) demonstrating competence, 3) escalation, 4) gathering support, and 5) seeking sighted help. We expand on the idea of advocacy as a form of access work performed by people with visual impairments to secure and maintain access to digital banking.

CCS Concepts: • **Human-centered computing** → **Accessibility theory, concepts and paradigms**.

Additional Key Words and Phrases: Accessibility, social accessibility, collaborative accessibility, work, access work, blind users, banking, digital banking, FinTech, India

1 INTRODUCTION

Although accessibility research has begun to move beyond building and evaluating assistive technologies (AT) to also understand the social context of technology use, the ready availability of and access to technology is a given and a starting point in much of this work. Less is understood about how people with disabilities gain access to technologies in the first place and the challenges they encounter in doing so. This paper addresses this gap via a case study of how people with visual impairments gain access to digital banking services in India.

India has one of the largest populations of people with visual impairments in the world [77]. People with visual impairments, like other people with disabilities in India, are a marginalized group and struggle with social and economic participation [4]. Among the factors that limit their participation are structural barriers like inaccessible educational material [73], limited availability of assistive technology in workplaces [55], and the lack of inclusive financial infrastructures [27, 58]

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that make conducting financial activities difficult [76]. Furthermore, larger cultural attitudes towards disability, resulting in people with disabilities being viewed as dependents and always in need of help, also limit their inclusion [17]. Removing these barriers is critical to the wider participation of people with disabilities.

India is one of the largest and fastest-growing consumers of digital banking technologies. Digital banking services encompass three modes of banking: 1) internet banking, where people access banking facilities via a web browser, 2) mobile banking, where people use bank-specific mobile apps, and 3) digital payments, where people use third-party mobile apps to make payments for goods and services (e.g. Google Pay) [61]. The changes in the Indian banking landscape have been attributed to infrastructural and policy changes [12, 48] and to the growth of a tech-savvy urban middle class [54]. This changing landscape has also interested HCI and CSCW researchers who have studied how the increased digitization of banking services has impacted the lives of several groups of users such as auto-rickshaw drivers[1] [22, 40, 52], urban small business owners [54], and migrant laborers [44]. However, less is understood about the challenges that users, especially people with disabilities, face in accessing digital banking services in the first place and how they work around these challenges. In this study, we address this gap by studying the technology access challenges of one group of understudied users: people with visual impairments in India.

In the context of technology, the term *access* can be used in two senses: technology being within a person's reach; and technology designed in a way that works for people with disabilities. We examine challenges involving both senses of the term. Through a qualitative study involving 30 interviews, we found that most participants were not granted access to digital banking services due to a lack of awareness of their rights and misconceptions regarding their technical competency. As a result, participants were forced to engage in a range of strategies, that we collectively term *advocacy work*, to gain access to digital banking. Participants had to continue engaging in advocacy work even after obtaining access, to address social and technical breakdowns that disrupted access to digital banking. Building on these findings, we make the following contributions to HCI and CSCW literature:

- We describe the many challenges people with visual impairments face in gaining access to and using digital banking services in an Indian context.
- We describe the range of strategies—that we collectively term advocacy work—that people have to employ to gain access to digital banking and describe a novel dimension of advocacy work.
- We discuss advocacy work as a form of access work and suggest that accessibility researchers should examine the availability of technology in addition to its usability and acceptability, and propose that advocacy work may facilitate the co-creation of access with strangers and short-term acquaintances.

2 RELATED WORK

2.1 Assistive Technologies for People with Visual Impairments

Much of the formative work in Assistive Technology research in HCI has concerned the design, development, and evaluation of technologies to support the needs of people with disabilities. For instance, a popular line of work examines how computer vision technologies might support people with visual impairments with object [7, 25], people [25, 70] and image recognition [24, 81]. However, more recently, assistive technology research is undergoing a "turn to the social" [20, 63] with work beginning to examine the situated use of technology by people with disabilities, including the social concerns and social interactions surrounding the use of assistive technology. Shinohara and

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[1]Auto rickshaws are a form of public transportation - three-wheelers vehicles available for hire in large parts of the country

Wobbrock found that there are two misperceptions about assistive technology (AT): 1) that AT eliminates disability and 2) that people with disabilities are helpless without AT [66]. Shinohara and Wobbrock also found that the form and function of ATs impede social interactions by impacting the self-confidence and self-efficacy of people with disabilities [67]. On the other hand, Thieme et al. found that people with visual impairments leveraged social interactions to make sense of their surroundings and hence argue for technologies to leverage social interactions rather than seeking to eliminate them [71]. Morrison et al. found that people with visual impairments sought technologies to help engage in social interactions without drawing attention to their disability [42].

A separate strand of socially oriented AT research has established the collaborative nature of accessibility in different contexts [20, 63]. For instance, Branham and Kane showed that people with visual impairments collaborate with their partners and co-workers to co-create access in homes and workplaces [9, 10]. Others have examined the collaborative practices of people with visual impairments in relation to navigation [28], shopping [79], writing [15], using ride-sharing services [11, 26], sharing photos [80], and making payments [27]. This work, along with the rest which fall under the umbrella of 'social accessibility' highlights the need to look beyond the functional and instrumental aspects of technology to understand how its use is socially situated, which this paper aims to do.

2.1.1 The invisible work of access. Despite emerging work in AT research focusing on the social, a majority of work still centers the technological artifact, highlighting its role in facilitating access for people with disabilities. However, more recently, research has begun to challenge this techno-centric perspective, arguing instead for the need to recognize and center the work done by people with disabilities in creating and maintaining access. The need for this shift is underlined by Bennett et al. who argue that people with disabilities and their contributions in creating access are often understated. Hence, they propose an interdependence frame to highlight the role of people with disabilities and bring to light the invisible access work they perform [6]. Branham and Kane demonstrated that people with visual impairments in workplaces often performed work that went beyond their core job responsibilities, although these tasks were critical to them being able to carry out their job responsibilities effectively (e.g., working around inaccessible printers) [10]. Das et al. observed that people with visual impairments had to advocate for accommodations and accessible practices in workplaces [15]. This self-advocacy laid the groundwork for their participation in collaborative writing tasks with their colleagues [15]. In this paper, we extend this idea of advocacy as a form of access work, by examining how it manifests in relation to people with visual impairments and their use of digital banking services in India.

2.2 Digital Banking for Marginalized groups

HCI and CSCW research has found that digital banking has several benefits for marginalized populations [22, 40, 44, 52]. Vashishta et. al. find that for rural and semi-urban people in India, digital banking enhances saving and prompts increased monitoring of financial activities [72]. Kumar et. al. find that for small business owners, such services could encourage speedy transactions by reducing interactions associated with cash use (e.g. collecting change, maintaining record books) [34]. A key theme in these studies is the uncovering of invisible work central to the accomplishment of financial activities. For instance, it has been shown that the management of personal finances for auto-rickshaw[2] drivers entails collaborative work between them, family members, banks, and loan collection officers [40]. The goal of much of this research is to uncover how technology might better support these practices and invisible work.

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[2]Three-wheeler transportation in India

2.2.1 Digital Banking and Accessibility. Prior work at the intersection of digital banking and accessibility primarily focuses on the accessibility challenges inherent in banking tasks for people with visual impairments and how the tasks might be better supported by technology. For instance, the inaccessibility of currency notes has prompted extensive research examining how camera-enabled smartphones might assist with the quick and accurate identification of currency [38, 53]. Another strand of work has uncovered mechanisms to improve the accessibility of ATM machines [14, 51]. For instance, Curran et. al. uncover how navigation menus in ATMs might be made more accessible to people with visual impairments [14]. Papers have also looked at people's experiences with existing banking technologies and how they present challenges to their inclusion. For instance, Ahmed et. al. find that using ATMs in public locations presents privacy and security challenges for people with visual impairments and recommend making information about their vicinity available to improve people's experiences [2]. Singanamalla et al. find that most ATMs in India are inaccessible and outline the design of an accessible smartphone app that enables visually impaired people to conduct transactions at such ATMs [68]. Wentz et al. find that limited screen reader accessibility, visual CAPTCHAs, and features such as mobile check deposits impede the use of digital banking by people with visual impairments [76]. Kiiti and Mundada, in their study examining M-PESA, a major mobile money app in Kenya, found that people with visual impairments were unable to use the app as they did not own screen reader-enabled phones [33]. As a result, they had to seek other people's help to conduct transactions, which required sharing private information such as PINs with their helpers, sometimes leading to helpers cheating people with visual impairments. Closely related to our paper is work by Kameswaran and Muralidhar who examined the use of digital payments by people with visual impairments in India. They found that digital payments helped people overcome the troubles with currency notes and made it possible for them to transact in several locations for the very first time [27]. However, this work mostly focuses on the at-transaction benefits of digital payments alone, and less on the access and ongoing troubles of keeping them and broader digital banking technologies in operation. In this paper, we fill this gap.

On the whole, prior work tends to assume that the opportunity to obtain digital banking services is a given for people with visual impairments. Design is seen as a mechanism to foster, improve, and maintain the accessibility of ATMs and other digital banking technologies. In this paper, we examine the challenges people face in obtaining digital banking services, and people's subsequent and ongoing struggles in maintaining the accessibility of these services. In doing so, we also uncover their work in addressing these challenges.

3 METHODS

Participants for the study were recruited through Access India (n=19) - an online group for people with visual impairments in India, personal contacts (n=2), and subsequent snowballing (n=9). The project was approved by our institution's IRB. We conducted 30 semi-structured interviews with people with visual impairments from across India between March-June 2020. Twenty-eight (n=28) interviews were conducted in English, which the participants were comfortable and fluent with, while two interviews were conducted in Hindi, a regional language spoken by a large percentage of the Indian population, including by members of the research team. We obtained verbal consent from all participants to audio-record the interviews. The interviews were structured to elicit narrative accounts [36] of participants' experiences with banking services, challenges they encountered, and factors that affected their use, or non-use of banking services, while conceptual questions were used to understand participants' notions of independence in relation to banking services. The interviews lasted between 60 and 75 minutes and were conducted via Skype, Zoom, or phone calls. We compensated participants Rs 500 (approximately $7.00 US) for their time. The interviews were transcribed verbatim by the research team. The two interviews in Hindi were translated into

English by the first author. Interviews were continued till we reached saturation [21] - that is until no new codes or themes emerged from the data.

Data Analysis: The interviews were analyzed by the first author who co-conducted all interviews and was closest to the data [39]. The interview data was analyzed through a two-cycle bottom-up inductive process. In the first cycle, we used descriptive codes [64] to identify topics that emerged from the interviews. In total we identified four descriptive codes: 1) Benefits of digital banking, 2) Challenges with digital banking, 3) Work done to overcome accessibility challenges, and 4) Outcomes of work done by people with visual impairments. In the second cycle of coding, we further grouped some of the data in the four codes under several codes. For e.g., the data under the 'work done to overcome accessibility challenges' was further categorized into the following codes 1) Creating awareness, 2) Highlighting competence, 3) Escalating issues, 4) Gathering support, 5) Diagnosing and solving accessibility issues, and 6) Finding and seeking sighted help. Overall, we developed seventeen new codes in the second cycle of coding. In this paper, we explicate the four codes and seventeen sub-codes generated in the two coding cycles.

3.1 Participant Demographics

Participants were between 20 and 65 years old (mean age = 33, median age = 30.5). Of the 30 participants in the study, 20 identified as male, and 10 identified as female. It was challenging to recruit female participants, likely because the researcher leading the recruiting efforts was male. We used snowball sampling as a way to partially account for the gender imbalance. Participants lived in sixteen cities/towns. A majority lived in urban metropolitan cities (n=24) while a few (n=6) lived in rural towns. Twenty-nine (n=29) participants identified as totally blind while one participant (n=1) identified as low-vision. All participants used screen readers to access their computers and mobile phones. Most participants (n=20) used Android mobile phones (with Talkback) while a smaller number (n=7) used iPhones (with VoiceOver). Three (n=3) participants reported owning both, an iPhone and an Android phone. A majority of participants (n=25) in the study were employed, while the rest (n=5) were students. Our sample is *not* representative of the larger population of people with visual impairments in the country, many of whom live in rural areas [41] and a majority of whom are illiterate and unemployed [4].

3.2 Positionality

We are three disability and accessibility researchers with over 10 years of experience working with people with disabilities in both Global South and North contexts. We understand that our observations will be filtered through our individual identities. The first author identifies as male, non-disabled, and sighted. The second author identifies as female and as a member of the community of people with visual impairments. The last author is transgender, non-binary, disabled, and sighted. All of us grew up in urban Indian cities and identify as upper-caste individuals. In addition, we are upper middle class due to our socio-economic status and education.

4 CONTEXT

4.1 The digital banking landscape

Although India has traditionally been a cash-based economy, in recent times, the country has witnessed an exponential increase in the adoption and use of digital banking services [61]. The adoption of digital financial technologies among India's population is one of the highest in the world [23]. It is estimated that today over 200 million Indians actively use digital banking, a number that is expected to double in the next 5 years [61]. The number and volume of digital banking transactions have also increased multi-fold in the last few years. While in 2018 there were

a reported 3.6 billion digital banking transactions [32], this number grew to 35 billion in 2021 [31]. This dramatic increase is attributed in part to the government's push for a cashless economy, evidenced by the Digital India vision [48] that has sought to promote financial inclusion among marginalized people through the increased digitization of banking services [65]. Other factors which have spurred this growth include the widespread availability of low-cost internet, high smartphone penetration, and nationalized biometric IDs [12].

Digital payments (e.g., Google Pay), i.e., payments done through digital platforms without cash being involved, in particular, have seen remarkable growth in India. In addition to the above factors, the Government of India's demonetization of banknotes in 2016, where Rs. 500 and Rs. 1000 were declared void overnight [13], and the COVID-19 pandemic have further contributed to the rise of digital payments [5]. India is the world leader in digital payment transactions, registering 60% more digital payments in 2021 than second-in-line China [12]. The flexibility and ease-of-use of payments [18] has contributed to its ubiquity and spurred adoption by both merchants (e.g., street vendors and small business owners) and customers despite barriers such as low digital literacy and familiarity with and preference for cash [54]. The growth of digital payments too is expected to continue: it is estimated that by 2026 India would have transitioned to a digital economy, where 2 in 3 payments are expected to be digital [43].

4.2 Technology and Accessibility in India

The value of technology in the lives of people with visual impairments in India has been discussed in detail in prior work [26, 58, 59]. In addition to allowing people to perform otherwise impossible tasks, technologies also allow them to circumvent structural barriers [26, 27], which are rampant in Global South contexts like India [19]. For instance, Kameswaran et al. discuss how ride-hailing services (e.g., Uber) allow people with visual impairments to circumvent crowded, delayed, and inaccessible public transportation infrastructures (e.g., buses), thus contributing to an increased sense of independence [26]. However, despite these benefits, digital technologies including websites and mobile apps, especially those developed in India, are rarely accessible [45, 46]. The accessibility of technology is dictated by accessibility standards and compliance measures, which are typically enforced through legal mandates, such as the Americans with Disabilities Act (ADA) in the United States [1]. In India, while the Rights of Persons with Disability Act [49] requires technologies to be compliant with accessibility standards, it is not enforced [45, 46]. This often puts the onus on people to find workarounds and solutions to inaccessible technologies.

5 FINDINGS

We found that digital banking was beneficial for people with visual impairments in many regards and it helped them overcome the many challenges of physical banking. However, people were discriminated against by bank officials and struggled to secure access to digital banking. Moreover, they encountered several inaccessibilities in the course of using digital banking. As a result, in order to secure and maintain access to digital banking they performed work, which took several forms. In the following sections we describe 1) the benefits of digital banking for people with visual impairments, 2) the challenges in accessing digital banking, 3) the work performed by people with visual impairments to secure and maintain access, and 4) the outcomes of this work.

As mentioned earlier, digital banking encompasses three modes of banking 1) internet banking 2) mobile banking and 3) digital payments. Twenty-five participants used internet banking and mobile banking, twenty-seven participants used digital payments, while three participants did not use digital banking as they were uncomfortable with technology. Participants used digital banking

to transfer money to others, track money, manage investments, pay utility bills, and purchase talk-time for prepaid phone plans.[3]

5.1 Benefits of digital banking

Digital banking extended several conveniences for our participants, allowing them to complete financial tasks at a time and location of their choosing. For example, mobile banking and digital payments enabled participants to transact on-the-go using their mobile phones which saved them the additional work required with internet banking, i.e. starting up a computer, opening a web browser, and typing a URL. The on-the-go benefits of digital banking extends to all users, but they are magnified for people with visual impairments for whom banking can be cumbersome or inaccessible.

Perhaps most importantly, digital banking reduced the need for participants to deal with the inaccessible interfaces and infrastructures that characterize physical banking. Physical banking posed three key challenges for participants, which we will now address.

5.1.1 Getting to and navigating the bank environment: Many Indian banks use an inaccessible token system to regulate the order in which customers are serviced. Each customer is required to obtain a slip of paper containing a number (called a token) from a dispensing machine located near the bank entrance. Once a bank operator is ready to see a customer, the system displays that operator's desk number next to the token number that will be serviced. The customer bearing the appropriate token is then required to approach the operator's desk. The token system thus precedes all physical banking tasks. Participants spoke about the inaccessibility of the token system:

> You have to take a token. There's a machine. You yourself have to go physically take out the printed slip... I mean, people with vision impairment cannot do it by themselves. A number is written on that slip. That number is displayed over a screen. After seeing that number on the screen, one has to go to that particular [desk]. - P6

In addition to the difficulty of locating the token dispensing machine, participants had to deal with inaccessible modes of communication for token numbers, such as only being displayed on a screen instead of also being announced. This was further compounded by the requirement to approach a specific desk, the location of which was not evident.

Participants also reported struggling with getting to the bank and navigating the indoor environment. Reaching the bank required participants to navigate crowded and largely inaccessible transportation systems and urban landscapes [26]. Navigating indoor environments required finding doors of entry, figuring out the layout of the waiting area, and determining where to go once inside the bank.

5.1.2 Paperwork: Physical banking tasks also entailed paperwork, such as filling out slips for deposits and withdrawals, requiring people to handwrite details like one's account number, amount to be deposited/withdrawn, currency denominations required, etc.

> When I go to bank, I am going with some assistance because in the bank, we have to fill a slip. ... My parents help me write the [cash deposit] slip. ... how many denominations, which denomination, which kind of notes. - P12

Since tasks involving paperwork were inaccessible to people with visual impairments, they had to rely on the assistance of sighted family members, friends, and even acquaintances to complete simple transactions.

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[3]Prepaid mobile phone plans are very common in India. In a prepaid plan, users recharge their phones, i.e., pay ahead of time, for calls, text messaging, and data services.

5.1.3   Interacting with banking officials: Physical banking also required people with visual impairments to make requests and seek the assistance of bank officials to get their needs met. Participants reported that accommodations and help were hard to come by as P22 describes.

> Sometimes the [staff] are not cooperative... [My] password was not working... I visited the branch I think more than dozens of times and I told them, "look I am visually impaired". So they said "what can we do you know, we are also working". - P22

In most cases, as in the case of P22, banking staff were described as being busy. Public sector banks in India are crowded and busy making it difficult for staff to pay attention to customers' specific needs. Participants viewed help from bank officials as a key accommodation to circumvent the challenges of physical banking. However, as this help was rarely available, it magnified the troubles of accomplishing tasks in a banking location. As a result, people were forced to seek help from and coordinate visits with family and friends.

> I had to take the help of people to go to the bank.. This was really, really irritating.. It takes your independence... [With digital banking] I can pay my utility bills sitting here... I write accounts, I keep track... I know my expenses... For people with normal ability, [digital banking] is a convenience. [But] for us, it makes things possible. - P24

Like with P24 above, people did not like that they had to seek assistance with banking activities as it resulted in a compromise on their sense of independence and privacy. Digital banking did away with this compromise and allowed people to carry out a number of financial activities on their own. Most participants lauded the many benefits of digital banking. They could receive money directly into their bank accounts and transact digitally in most locations. With online statements, participants could get a snapshot of their accounts and track finances without sighted help. Money transfers helped them to circumvent troubles with cash-based transactions, by reducing the need for inaccessible currency notes[4]. Digital banking enabled some participants to invest in mutual funds, stock markets, and fixed-term deposits. Finally, digital banking helped pay utility bills and recharge talktime on pre-paid phones, activities that otherwise required help to reach the right location (e.g. the office of a utility company), and complete transactions.

5.2   Challenges with accessing digital banking

Participants experienced many challenges in obtaining access to digital banking services. Participants also faced several inaccessibilities while using the services.

5.2.1   Discrimination and denial of services. People with visual impairments were often discriminated against by bank officials as a result of which they faced several difficulties in accessing and interacting with banking services. Nearly all our participants noted instances where officials denied them access to digital banking services including internet and mobile banking and ATM card access. This is in stark contrast to non-disabled and literate people who expect and are given access to these services as a matter of course.

> After opening the account, when I asked the banking personnel to provide the ATM or internet banking, they denied me... they said that visually impaired are not entitled to use these services. - P7

In Indian banks, customers typically have to enroll in digital banking services by filling out and signing a paper-based form, often at the time of opening one's bank account. To sign this form, several participants preferred using thumb impressions (over signatures) due to concerns about being unable to accurately reproduce signatures. The accurate reproduction of signatures is

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[4]Indian currency notes are inaccessible in that notes of different denominations have the same length, making it difficult if not impossible for people with visual impairments to distinguish between denominations.

a pre-requisite for bank officials to accept and process forms and other banking-related documents. However, using thumb impressions resulted in bank officials equating participants with illiterate people, which then became grounds for denying them access to digital banking.

> That is the policy of all banks where if you give your thumb impression you are considered illiterate... [then] you will face more problems... you won't get ATM card, you won't get any other services. - P18

In other cases, the limited awareness of disability among bank officials resulted in participants being questioned about their capability to engage in banking activities. Officials believed that providing people with visual impairments with access to digital banking increased the likelihood of fraudulent transactions and thereby posed risks to the bank.

> At the time of new account opening they denied me a cheque book and also told me that you we can't give you ATM because its possible that some kind of fraud occurs with you.. [They asked me] who will be responsible for that? - P12

Bank officials holding such misconceptions about people's abilities denied participants access to digital banking as well as broader facilities such as checks and loans. This type of infantilization also extended to other interactions, where bank officials openly wondered why participants had showed up alone or exclusively addressed participants' non-disabled companions instead of speaking to participants.

Discrimination played out in other ways too. For instance, despite people with visual impairments' right to access digital banking like anyone else, they were often selectively asked to go through uncommon and unnecessary processes to secure access (e.g. produce additional documentation such as disability certificates). The discrimination that people faced was not limited to banking and several participants noted how their experiences with banking were only reflective of their broader experiences in society.

5.2.2 The inaccessibility of security mechanisms. Logging in and conducting transactions on banking websites and apps required the use of security mechanisms such as One-Time Passwords (OTP) and CAPTCHAs, which were often inaccessible to people with visual impairments. One-time passwords require users to type in a unique code which they receive via text message on their registered mobile phone to confirm logins and transactions. Although a few appreciated the additional layer of security OTPs provided, they noted how OTPs were notoriously difficult to use. This was because OTPs require people to do the work of 1) switching between multiple apps (banking app and text messaging app) or devices (computer and mobile phone), 2) remembering a 6-8 digits long OTP, and 3) entering the OTP in the right location within its time of expiry.

> [For fund transfers] I'll get the OTP on my phone... I will see that and ill try to by heart [memorize it] and enter into OTP box... I have to use two different devices... it's really really difficult - P2

CAPTCHAs were another security mechanism that preceded logins on some banking websites. Here, participants noted difficulties caused by the lack of audio CAPTCHAs.

> This new mobile banking website they have introduced the CAPTCHA option which is highly uncalled for, which is highly objectionable... because a VI person will not be able to enter the CAPTCHA without sighted persons help. - P10

Although a few participants worked through visual CAPTCHA issues on their own (e.g. using image detection tools), most others like P10 sought help, which was frustrating as it entailed a compromise on their independence.

5.2.3 Other tech inaccessibilities. Unlabelled buttons and unclickable elements that made banking websites and apps were extremely common in our participants' experiences. Credit and debit cards were inaccessible as CVV numbers were unavailable in raised text formats [27] and because people are required to swipe their card and enter details (e.g. a numerical PIN code to authorize transactions) on inaccessible keypads at the point of transaction. Point of Sale (POS) machines (like Square in the USA) were not equipped with screen readers and hence, impossible to use on one's own. Circumventing these inaccessibilities entailed a compromise on participants' privacy as it required them to share private details (e.g. PINs) with others to help them complete transactions.

> I give card to them [vendors and people who accompany], they will swipe. They'll ask me to enter PIN... If I'm unable to enter, I will tell them the PIN. - P21

Despite the pervasiveness of digital banking services, participants still encountered scenarios requiring cash. Local public transportation systems and smaller stores only accept cash, for example. ATMs were almost always inaccessible because the kiosks lacked braille markings on keypads and screen-reader facilities. As with credit and debit cards and POS machines, using ATMs too entailed a compromise on privacy as participants needed help to use these machines. Other troubles included getting to the ATM and concerns over shoulder snooping at ATM locations [68].

5.3 The work of securing and maintaining access to digital banking

Digital banking allowed people with visual impairments to conduct several financial activities on their own resulting in an increased sense of independence. However, people with visual impairments faced challenges in accessing and using digital banking due to a combination of social and technical factors. To secure and maintain access to digital banking, people did work to fight the discrimination they faced within the banking system and make access to digital banking possible. This work, which we term *advocacy work*, consisted of several dimensions that we now describe.

5.3.1 Creating awareness. Bank officials had limited awareness about people with disabilities and their rights to access banking services. As a result, when denied access, people often stated their rights to bank officials, quoting policy documents from the Reserve Bank of India (RBI), the central treasury in the country. These policy documents mention the right of people with visual impairments to obtain access to all banking services and use thumb impressions as signatures. However, in most cases, merely quoting their rights did not suffice and people resorted to carrying and producing printed versions of the same documents to secure access.

> In India you have to fend for your own rights... You take a printout of the relevant RBI notification... [with] Canara Bank once I showed them the rules and told them these are the relevant points and if you're denying me account, you're violating RBI rules, they kind of agreed. - P23

When bank officials associated using thumb impressions with being illiterate, participants stated their educational qualifications and employment status to underline the incorrectness of the association.

> There is some form which is to be filled by illiterate people who use thumb impression. So they were asking me to fill that form. I said why should I fill that, Im PhD scholar. So then, they said, "okay sir don't fill this form" and then they opened my account. - P12

Participants' goal in doing so was to ask bank officials to treat them on par with non-disabled customers. A few participants also worked at banks and these insiders created awareness about disability in their workplaces. Insiders used informal conversations to educate colleagues about how people with visual impairments like themselves could use and benefit from banking services.

Some like P3 took additional steps and compelled banking officials by stating how extending access could positively impact banks by reducing staff overheads and increasing their customer base.

> To sensitize certain staff, I advise.. I tell them, once you will be giving [digital banking] facilities to visually challenged, you won't be finding them in your branch... for printing passbook and many things... you won't be losing important resources like staff time, paper... We argue [with staff]... They are discriminating, they are losing business. - P3

The extent of awareness among bank officials was not the same across banks. A few participants held accounts in private banks and noted how officials there tended to be more aware and accommodating. Moreover, participants who held accounts in private banks had personal managers and one-to-one assistance which helped them negotiate banking-related issues easily. However, access to private banks tends to be limited to socioeconomically privileged people, a category that the majority of our participants did not fall into.

Creating awareness about disability and rights among bank officials for some participants was only a part of their broader awareness-raising efforts.

> It is like my pet project... I go to institutions and schools.. I tell them about my story... I sensitize them about things we can do, like screen readers.. [I] also tell them that no facility or school can deny your admission on the basis of your disability... To make sure nobody has to go through the same trauma which I had to. - P22

As participants lived in a society that had a limited understanding of disability, they felt the need to do their part to increase awareness by educating people including family and friends about disability rights, their capabilities, and ways of working. Radio shows, school and college visits, and demonstrations were some of the mediums by which people engaged in these efforts.

5.3.2 Demonstrating competence. When bank officials continued to infantilize people with visual impairments and question their capabilities despite attempts at raising awareness, participants were compelled to demonstrate their skill and competence at digital banking in particular and with technology more broadly. Participants routinely demonstrated their expertise by taking out their devices and talking officials through their process of using different technologies and performing tasks on them, including digital banking tools.

> [The] manager was a little hesitant that I will have problem in operating the account. So I will be losing money and I will blame the bank.. I showed my mobile, I logged into my Bank of Baroda net-banking.. [I] showed her how I am checking the balance, how I'm doing the payment, how I'm checking the bills, everything I showed. Then she is interested [asking], 'what is this phone? How are you operating it? What is the software used for that?' I showed her that it is available in your mobile phone also. We can operate in your mobile itself if we go to accessibility and switch on the software. I explained everything clearly. She's impressed. Then she activated [digital banking] services for me.- P8

Thus, P8 had to show her mastery over a different bank's digital banking app to convince an official that she deserved access to digital banking services. Indeed, to drive home the broader point that all people with visual impairments are capable of using the bank's digital services, P8 showed the official that she could use the official's own phone via built-in accessibility features, instead of requiring separate hardware or software.

Other participants educated bank officials about accessibility features in common technologies. In the below quote, P10 talks about educating bank officials about raised dots on the number keypads used in ATM keypads and telephones.

> We had to show the usual things we do to introduce a sighted person to accessibility. We showed [the bank manager] the dots on F key & J key... dots on number pad five key... we explained that even ATM machines have a dot on the number pad. - P10

Like P8 and P10, others noted demonstrating their use of mobile phones and computers, pointing out accessibility features on ATM machines and banking apps, and instructing officials on the use of screen readers. Many participants stated that demonstrating competence was one of the critical first steps to convincing bank officials of their capabilities.

5.3.3 Escalation. While raising awareness and demonstrating competence helped some participants get access to digital banking, most others had to resort to additional steps. Escalating issues to higher officials, legal bodies, and technology providers was another key strategy that people used when they were discriminated against. For instance, it was common for participants to seek out higher officials in banks, like branch managers, when negotiations with bank staff did not yield the desired results. Further, participants actively sought to find multiple people within and outside banks to escalate matters to, especially when escalation to one party was insufficient.

> [Bank staff] were not giving me the ATM [debit card].. I had to talk to the manager and told him about RBI circulars.. I told him that there are lot of circulars of RBI and if you are going to insist then Ill come tomorrow with RBI circular and then I will complain in CCPD. - P16

As with P16, others too stated how telling the officials about circulars and threatening them with legal consequences via complaints to the Office of the CCPD (Chief Commissioner for Persons with Disabilities) was sufficient to ensure access. In fact, the legal route was an escalation strategy that several participants were familiar with but had not resorted to with digital banking. People were also adept at using online mediums for escalation. They posted on disability-related groups and social media to draw attention to their troubles, gather support, and hold banks accountable.

> [During account opening] I really face issues... [I] went on Twitter and I started tweeting about this bank... They want to keep their social media image very clean... Till the time I did not went on Twitter, I did not start escalating matters with my office and with the bank relationship manager, my matter was not taken seriously.- P18

Escalation also helped people address tech inaccessibilities and maintain the accessibility of digital banking technologies. Participants escalated inaccessibilities to developers and technology providers through written complaints and emails pointing out accessibility issues with technologies and encouraging them to make technologies more accessible. PayTM, a widely used digital payment service in India was initially inaccessible to people with visual impairments. Its increasing popularity resulted in sustained efforts to make the app accessible.

> Adoption of PayTM was very widespread... It became imperative for us to push hard for PayTM accessibility... I reached out [to PayTM and their investors]... It was a combination of phone calls, emails and social media... [Investors] did call right up to the founder at PayTM and conveyed the word that you have to make it accessible - P27

P27's escalation strategy entailed leveraging his contacts to reach out to PayTM management and their investors to escalate issues with PayTM. Although his efforts resulted in one version of the app being made accessible, a few updates later the app went back to being inaccessible.

As is evident, part of the work done by participants entailed finding the right strategy that would work. While some used trial and error to do so, others (P18 above) used a combination of strategies at the same time. Despite this, escalation too did not always result in meeting people's needs.

5.3.4   Gathering Support. People also sought help from others to secure access to banking services. Advocating for access requires knowing one's rights in the first place, and participants noted reaching out to friends and other people with visual impairments (e.g. via online forums like Access India) in case they had troubles with banking officials. In response, people shared relevant RBI documents, information about banking rights, and how participants could use these details to secure access. In certain cases, participants sought others to accompany them to banks who in turn raised awareness, highlighted competence, and escalated on participants' behalf. Additionally, people who accompanied participants recounted personal experiences with digital banking, stating how they used the services and the value they derived from using them to compel officials to extend access. Others noted relying on insiders within banks to leverage their contacts and expertise in banking operations to extend support and secure access.

> One colleague is also VI and she's using Andhra bank.. [But] they didn't give her ATM card. [She] told me that you come and talk to them, you are using everything.. I will go to Andhra Bank for that ATM, for her service. For banking we have to fight everytime.. Banks are not that much aware that blind [people] can also use netbanking. - P20

People also collectively organized to escalate and address accessibility issues with digital banking. For instance, when the State Bank of India (SBI), where several participants had bank accounts introduced visual CAPTCHAs on their website, people organized on Access India, an online platform for people with disabilities to devise an escalation strategy. This strategy entailed bombarding the chairman of SBI with individual emails to bring light to the inaccessibility of visual CAPTCHAs and request for an alternate audio CAPTCHA option.

> Few months ago, they [SBI] suddenly introduced [visual] CAPTCHA.. But many visually challenged people wrote email to the leading management and promptly within weeks, one or two weeks, they supplemented it with audio CAPTCHA. - P3

Like with SBI, people reported using online platforms to collectively devise escalation strategies and co-signed letters and petitions to pressure banks and technology providers into driving change.

Finding solutions to inaccessibility issues with banking technologies was key work that participants engaged in to ensure that digital banking worked for them. People encountered several inaccessibility issues (e.g. unlabelled buttons) in the course of using digital banking technologies. When they did, they used their prior experience with technologies, technical and accessibility expertise, and trial-and-error methods to find solutions to these issues. P8, an insider who worked at the Bank of Baroda described the steps he took to ensure that the bank's mobile app was accessible.

> In [Bank of Baroda] mobile app most buttons are not labeled. While transferring funds, the box for [entering] PIN was not reachable with voiceover. We are unable to do anything..I mailed my manager and then Managing Director [MD].. I gave suggestion to MD that I will sit with them and test.. They said they will give app for testing before launching. They did that. In 2-3 weeks it got solved. - P8

On diagnosing problems and finding solutions, people shared their solutions with others and suggested solutions when escalating inaccessibility concerns to various parties.

5.3.5   Finding and seeking sighted help. Despite the efforts of participants to secure and maintain access to digital banking on their own, they occasionally had to resort to sighted assistance, which they found frustrating. After all, one of the key benefits of digital banking was the accompanying sense of independence. Security and tech inaccessibilities often necessitated sighted assistance to intermittently access and perform banking-related operations. People reported using sighted assistance for help in solving visual CAPTCHAS, clicking on unlabelled buttons, using debit and credit cards, and working with ATMs.

> ATMs are clearly not the best thing for me.. I go with my partner, or a friend and they
> help me... These ATMs, they have different ways of inserting the card. So I asked my
> partner to insert the card and then I ask them to read the screen. - P23

Since banking involves money and sensitive information, people only sought help from family and close friends. The unavailability of the right help at the required time either meant compromising privacy or delaying banking activities, thus depriving people of the ability to bank at any time from any location, a key benefit of digital banking.

5.4 Outcomes of advocacy work

The advocacy work done by people with visual impairments to overcome the challenges associated with accessing and using digital banking had functional, individual, and social outcomes.

5.4.1 Gaining and maintaining access to digital banking. Digital banking enhanced participants' sense of financial independence. However, bank officials' lack of awareness and discriminatory actions made securing access to these services difficult. Consequently, participants drew upon a range of strategies to convince bank officials. This advocacy work eventually resulted in access to digital banking services.

> [Bank officials] said we can't give you account, how will she handle [it]?... We showed
> the article they released from government... [Bank manager asked] how she will manage
> the account without anyone... how she will use ATM card? ATM is not a right for
> [people with visual impairments].. I said, everyone is having ATM... Then they gave
> finally. - P26

Escalation, collective organization, finding solutions to inaccessibility issues, and sighted help also helped people maintain the accessibility of digital banking and use them on an everyday basis possible. People used these strategies to appeal to different actors including bank managers, technology providers, and legal bodies to ensure that technology issues were addressed. This work too, like the work of securing access, was ongoing and required people to stay on top of evolving accessibility issues (e.g. new accessibility issues resulting from software updates) and find the right redressal approach when confronted with the issues.

> First of all, for net banking, for ATM, for anything, I have to fight there. Every time the
> staff will change every time I have to give the circular and I have to tell them, I have to
> inform every time.. I don't have that much time to go and tell them. - P20

Thus, using a bank account necessitated creating awareness among constantly changing bank staff. Eventually, P20 deemed this as more work than she could handle. She stopped using this account and moved to another bank instead.

5.4.2 Establish expertise. Digital banking also helped people establish expertise within personal circles. People with disabilities are often seen as incapable and dependent, i.e., in constant need of assistance, in India. Countering this common understanding, participants' competence in digital banking (made possible through the strategies described in subsection 5.3) helped them fight this stigma to some extent. People used their expertise in digital banking to educate others about digital banking features and ways to use them. In addition, they performed banking activities for family and friends which in turn resulted in an increased sense of self-esteem.

> You are disabled and people don't expect you to be on top of everything... When you
> teach people [how to use digital banking], it makes you feel you are informed and
> capable... I've done things for people with digital banking... It also has amplified my
> sense of pride and made me feel more dignified. - P23

The fight to secure and maintain access also put people at the forefront of disability activism and led to people like P18 equating his awareness-raising and escalation efforts with the efforts of freedom fighters.

> I get a feeling that I am like a freedom fighter and I'm fighting for all the rights for all, maybe for myself... I'm fighting for all the rights.. every time I have to fight. - P18

The term freedom fighters refer to people at the forefront of the Indian independence movement that liberated the country from three centuries of colonial British rule. In P18's case, the positive outcomes resulting from his resistance to inaccessible structures instilled feelings of confidence and pride in himself as an agent of social change, leading to him equating himself with freedom fighters.

5.4.3 Individual and social costs. The work done by people with visual impairments to secure and maintain access took a toll on them. While some participants engaged in this work repeatedly, sometimes over the course of multiple bank visits spanning several months, others noted how despite their use of several strategies, they still were not able to secure access. It was not surprising that people felt that this work was burdensome as in reality they were entitled to access banking services just like everyone else.

> It's never a good feeling to argue for yourself, right? I would like to be treated as any other customer. [Access to banking] is something that I as a citizen in this country deserve without any additional burden... It reminds me that as a person with disability, I have to do extra work... It's not a pleasant thing. I don't want to do that. - P23

For many, this work was not a choice. In fact, much of this work in the context of digital banking was only a small part of their larger everyday fight for equality and inclusion which many termed as a necessity to get by in a country where their rights are often not recognized. A few participants like P14 below explained how her constant awareness-raising and escalation strategies, resulted in her being perceived as combative and anti-social.

> Advocacy is required not just in financial matters, but also on an everyday basis. [Advocacy] is like forever happening... Advocacy is not a choice for me... I have to advocate for myself in order to do anything...[Advocacy] tends to make me a little antisocial... So it definitely does take a toll on me. - P14

As a result of these individual and social costs, people were careful about where, when, and how they demanded their rights be recognized and conscious about the work this entailed and its likely negative impacts. The exhausting nature of this work is further emphasized by participants like P20 who gave up on the fight to secure and maintain access to digital banking after a while.

6 DISCUSSION

Securing and maintaining access to digital banking requires people with visual impairments to perform work, which we term advocacy work. Advocacy work was used to address the troubles with both the social and technical inaccessibility of digital banking, which we first turn to. Then we discuss advocacy work in relation to access work. We conclude with a discussion on digital banking in the context of people with visual impairments in India and highlight some recommendations to make banking more accessible.

6.1 Social and technical (in)accessibilities in digital banking

Participants routinely experienced social inaccessibility when interacting with bank officials: they were denied access to digital banking, treated in an infantilizing manner, ignored, and assumed to be illiterate. These instances constitute a broader understanding of social (in)accessibility in comparison

to prior accessibility work, where the term social (in)accessibility has primarily concerned the use of technology in social settings. For Shinohara and Wobbrock, for instance, social accessibility is about how assistive technology (AT) affects the social participation of and perceptions about people with disabilities [67]. We extend this understanding and bring to light a new form of social inaccessibility that reduces people's opportunity to even try technologies like digital banking: interactions unmediated by technology and characterized by bank officials' limited awareness of people with disabilities. This social inaccessibility preceded securing access to digital banking. Although prior work has shown that the cost and availability of AT might impede widespread use [56, 57], for the most part, technology access issues are understudied in accessibility research. In fact, both the social and technical strands of accessibility research are based on the use and evaluate paradigm. Here, the ready availability of and access to technology is taken for granted as the starting point from which to understand how technology might be better designed to cater to the needs of people with disabilities (e.g. [7, 15, 16, 26, 27, 29, 30]). For instance, usability experiments, where people with visual impairments use smartphones to perform a range of tasks have been used to draw conclusions about the accessibility of smartphone gestures [16, 29]. Likewise, qualitative work by Das and Kameswaran examines people with visual impairments' use of collaborative writing tools and ride-sharing services to uncover implications for how these technologies might be made more accessible [15, 26]. As is evident, in these studies, access to technology is a given. However, this was far from true for our participants. Hence, we suggest that AT researchers should examine the availability and social context of technology in addition to its usability and acceptability, when studying technology use by people with disabilities.

Technical inaccessibility was also inherent with digital banking services. Once people secured access, they encountered a range of inaccessibility issues that have been discussed in prior work. For instance, inaccessible ATMs [53, 68] and CAPTCHAs [76] as well as general usability issues (e.g., unlabelled buttons) [15, 27] have been discussed extensively. We confirm that these issues manifest in digital banking services and also surface two additional issues with OTPs and POS machines. While people appreciated the security provided by OTPs, they were very difficult to use as they required switching between windows/devices and memorizing and entering passwords within a very short time frame. POS machines were not equipped with screen readers and raised keys, and were hence unusable without sighted assistance. The usability of OTPs in particular could be improved by implementing passcodes that are easy to memorize and easing the process of copying and pasting them between different windows (e.g., through automatic detection). Increasing the time validity of OTPs, particularly on detecting screen reader use, could also go a long way in enabling participants to use OTPs at a comfortable pace.

6.2 Advocacy work

Advocacy work was necessary to overcome both social and technical inaccessibilities. While advocacy and activism have been spoken about in the context of people with disabilities in HCI and CSCW research, this research is often limited to social media contexts (e.g. [3, 37]), with a focus on understanding the role of technology in facilitating activism. In contrast, our work contributes a more interactional account of advocacy work in an offline context; one where advocacy and activism facilitate access to technology (and not the other way around). This is likely an important direction for future research to explore in India and other contexts with considerable barriers to technology access.

We find that advocacy work in digital banking has five dimensions: 1) creating awareness, 2) demonstrating competence, 3) escalation, 4) gathering support, and 5) finding and seeking sighted help. Thus, we contribute the novel dimension of demonstrating competence in addition to confirming prior research showing that the work of self-advocacy involves creating awareness

[15, 60], escalation [3, 37], and gathering support [3, 37]. Demonstrating competence is a particularly interesting dimension of advocacy work because it requires participants to prove their ability to use and indeed show mastery over a form of technology that they do not yet have access to. In other words, to obtain access to digital banking, participants had to demonstrate that they already knew how to use digital banking. Given the pervasive infantilization and lack of faith in the capabilities of people with visual impairments, it was often only by demonstrating their ability to use (a different bank's) digital banking services and other forms of technology that participants were able to secure access to digital banking. Demonstrating competence is thus a critical element of interpersonal advocacy work, allowing people with visual impairments to provide tangible evidence against and thereby counter the misconceptions of bank officials.

Creating awareness about disability, disability rights, and accommodations was another key step in securing access to digital banking. Prior work has spoken about how creating awareness is critical to securing workplace accommodations [10, 15, 60], and we confirm its value in the banking context in India: producing documents related to the rights of people with disabilities and educating bank officials about the same helped some people secure access to digital banking technologies. Similarly, escalation, both at an individual and collective level, and gathering support have been highlighted as vital to activism in studies examining the role of social media in activist movements [8, 37]. In addition to confirming the value of social and online media in creating awareness, escalating, and gathering support, we also show how these strategies play out in interpersonal interactions with bank officials. People escalated issues within banks, often seeking out bank managers or bringing friends along to convince bank officials to grant access. In effect, it is not just online media, but a combination of in-person and social media-driven strategies that helped people secure and maintain access to digital banking services. Future research should systematically examine the interactional dimensions of advocacy work to advance CSCW's long-standing interest in theorizing work.

We join Bennett, Das, and collaborators in suggesting that advocacy is integral to creating access by shining the light on the understated work done by people with disabilities to create and facilitate access [6, 15]. The fields of disability studies and disability justice have addressed the idea of access work in considerable depth. Piepzna-Samarasinha states that access work is often "underdocumented private work [that is] often not seen as real activism. But it is the realest activism there is" [62]. Yergeau argues that access work is "activist work [that] often goes against an institutional grain" [78]. Both are true in the advocacy work of our participants and we extend this understanding of access work to a technology context, that of digital banking. We add to this line of research by highlighting the presence of demonstrating competence as an important dimension of access work, which to our knowledge has not been suggested previously.

Scholarship in HCI has recently begun to examine the notion of access work in the context of interdependent relationships, emphasizing the collective work of people with disabilities and non-disabled people in co-creating access. [6]. We too find that access is very much co-created between people with visual impairments and banking officials. However, while prior work has examined how access is co-created in the context of long-term relationships, such as between people with disabilities and their partners or co-workers [9, 10], in the case of digital banking, access needed to be co-created with strangers (such as bank officials) and other short-term acquaintances (such as short-lived interactions on online forums). Hence, we propose that advocacy work enables the co-creation of access with strangers and short-term acquaintances, by addressing their misconceptions and getting them to appreciate the capabilities, needs, and desires of people with visual impairments.

Drawing on Star and Strauss's lucid commentary on invisible and visible work [69], prior work in CSCW has spoken extensively about the invisible work done by people with disabilities in facilitating and maintaining accessibility and shown that technology mediates the visibility of this work [15, 75]. We find that whether participants' work counts as visible or invisible depends

on the point of view one adopts. For designers and researchers invested in improving ATs by uncovering usability issues, issues of social inaccessibility are less likely to result in tangible implications for technology design and development (social inaccessibility has more to do with the deployment, implementation, and social context of technology), thus rendering invisible the work of our participants. However, from the standpoint of people with visual impairments, the work of addressing social inaccessibility is very salient and visible – people with visual impairments must actively strive to obtain access to digital banking.

6.3 On Digital Banking

Digital banking has several functional benefits for people with visual impairments such as the on-the-go convenience found in prior work [35, 72]. These conveniences are magnified for people with visual impairments because digital banking helps circumvent the inaccessible infrastructures and interfaces of physical banking (e.g., navigating banks, paperwork, and interactions with bank officials). Participants did not appreciate the necessity of working with sighted people to complete physical banking tasks. Prior work has viewed collaboration as essential to financial management and designed technologies to support this collaborative work (e.g. [40, 74]). In contrast, we show that the collaborative work of physical banking is viewed by participants as an infringement on their sense of privacy; another key reason why they found digital banking beneficial. Further, our study goes beyond the functional benefits of digital banking to also highlight its social and personal benefits. Digital banking allowed participants to establish themselves as experts among family and friends and perform tasks for them, which resulted in feelings of pride. Participants also derived an increased sense of independence from using the services.

Digital banking technologies were not without problems, however. People faced trouble in accessing and using them. While advocacy work helped participants, it often came at individual and social costs and many believed that they should not have had to do the additional work of advocacy. We propose two recommendations to improve the digital banking experiences of people with visual impairments. First, banks could consider implementing disability awareness training to create awareness among bank officials about how to best accommodate and communicate with people with disabilities (e.g., [47]). An implementation of such a program (for instance, as a part of new employee onboarding) at a national level could help reduce the advocacy work needed to secure access to digital banking. Second, stronger implementation of the Rights of Persons with Disability Act [49] (the equivalent of the ADA in the USA [1]), which often is a first step to ensuring technologies are consistently compliant with accessibility standards [27, 45] would ensure that digital banking services are consistently usable by people with visual impairments. If technologies remain compliant with accessibility standards, this will reduce the advocacy work associated with maintaining access to digital banking.

6.4 Limitations

We did not recruit a representative sample of the population of people with visual impairments in India. Our participants were mostly middle or upper-middle class, employed, and literate; whereas the majority of Indians with visual impairments are low-income, low-literate, and unemployed [50]. Future research should recruit participants from these groups to paint a fuller picture of advocacy work in digital banking. Further, most participants resided in urban locations. It would be interesting to examine whether and how advocacy work manifests in rural contexts as well as in other sociocultural contexts around the world. Finally, our results are based on the experiences of a limited number of participants, as is common in qualitative research. Thus, our results may not generalize to all people with visual impairments in India. Given the push towards digital banking

in India and elsewhere, future research should use large and representative samples and develop policy recommendations to resolve the sociotechnical problem of access.

7 CONCLUSION

We conducted a qualitative investigation on the digital banking experiences of people with visual impairments in India. We found that although digital banking made it easier for our participants to conduct financial activities, they encountered several challenges in securing access to it. Participants were routinely denied access to digital banking and encountered several inaccessibilities during and after obtaining access. To address these challenges, they performed advocacy work that drew together a range of strategies including demonstrating competence over the very technology they were seeking access to. We expanded on advocacy as a form of access work and showed that it was critical to facilitating and maintaining access to technology, and to co-creating access with strangers in positions of power.

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