Public WiFi is for Men and Mobile Internet is for Women: Interrogating Politics of Space and Gender around WiFi Hotspots

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Public WiFi networks are increasingly viewed as last-mile Internet solutions for rural areas given the infrastructure intensive nature of fibre optic broadband connectivity, but how inclusive are they? This study reports on interviews, observations, and practices around WiFi access points in public spaces in a rural community in India. It illustrates the ways in which Internet savvy women may continue to experience exclusions in Internet access and use. Bound by social norms that restrict their movements and tether them to spotty mobile data, women's Internet usage is limited in comparison to men, whose relatively unconstrained mobility permits them access and use of the free WiFi in the community. Additionally, interviews with a commercial WiFi provider reveals naive assumptions about women's Internet habits and gendered mobilities influencing access. The findings suggest that in certain contexts, women may remain invisible as potential customers despite their desire and ability to pay for WiFi access.

Public WiFi: • **WiFi Hotspots**; Internet; Mobile Internet; Infrastructure; Gender; Space; Digital Divide

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1 INTRODUCTION

India's vigorous efforts to haul its population on to the Internet connectivity grid involves numerous stakeholders who are enthusiastically pitching in to get the 'next billion' users online in various ways. The government has undertaken an ambitious policy initiative of laying optical fibre cables that will carry broadband Internet connectivity to the country's 250,000 gram panchayats (village councils), as one way to onboard its rural populations on to the Internet. At the same time, the government is also making a major push to provide free WiFi as a last mile Internet connectivity solution to rural areas as part of an initiative called 'Digital Village'. With a budget of USD 4.23 billion, the Digital Village program aims to cover 1,050 gram panchayats as an alternative to broadband through fibre optic connectivity that can be resource and time

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intensive to implement [1]. Concurrently, global Internet companies such as Facebook and Google are also working on providing public WiFi solutions, with Google partnering with the Indian Railways and Railtel in one of the largest public WiFi initiatives in the world. [4, 17, 18, 46, 50, 54]. Other public WiFi initiatives in India include urban services such as WiFi Dabba in Bengaluru that uses sachet pricing to sell WiFi at 0.031 US$ for 100 MB of data at the city's *kirana* (general stores) and bakeries [53]. Further, the Telecom Regulatory Authority of India (TRAI) has invited interested parties to establish nationwide pay-as-you-go public data offices (PDOs) in line with the public call offices (PCO) booths that revolutionized telephone connectivity in the country in the 1980s. As a regulatory body, TRAI is proactive in inviting and holding public consultation workshops and open houses on telecom matters, and has held similar open house public consultations on PDOs. However, TRAI's attention is also primarily centred solely around the technical architecture of WiFi infrastructure that address concerns such as user authentication, interoperability between networks, and payment authorizations [57, 58].

While the technical scaffolding for setting up public WiFi hotspots is crucial, are they sufficient to ensure last mile usage? Even as public WiFi hotspots are seen as a viable way to bridge the digital divide and provide Internet connectivity to India in both rural and urban locales, this paper interrogates the notion of the 'public' in a public hotspot. It draws attention to the politics of access and occupation of public spaces that complicates experiences and understandings of space, which in turn can create inequities in the access and use of public WiFi. It therefore contributes to CSCW concerns around social challenges that may inhibit "community" technologies like public WiFi networks from being inclusive towards different social groups, such as women seeking fast and reliable Internet connectivity to support and enhance the pursuit of their life goals. Internet infrastructure and access and use patterns are growing themes in the CSCW, HCI, and ICT4D literature. Together, they speak to the range of conditions under which people in the Global South access and experience the Internet and how this affects use.

For instance, Internet speed often dictates how people experience the Internet and the kinds of activities they can engage in. Research from Cuba shows that slow and unreliable Internet restricts people's online activities, nudging them into collaborative relationships with users who have better Internet access and who can complete online activities on their behalf [9]. Further, restricted Internet access has also led to the development of an 'offline' Internet in Cuba, one driven by the articulation work of human infrastructure [11]. In contrast and not surprisingly, households in India that were exposed to high speed WiFi reported a threefold increase in Internet activity along with a range of other positive shifts in usage and access behavior, including exploring newer online activities and finding more meaningful ways self-expression, self-improvement, and livelihood opportunities [51].

In other instances, where political conditions created impositions and restrictions on access to the Internet infrastructure and social networking sites, both the online and offline lives of users were found to be disrupted [44]. Similarly, in line with previous research on Internet infrastructure, access, and use, this paper contributes a feminist lens to CSCW concerns by highlighting gendered conditions of access to public WiFi.

The study reported here is situated in Arain, a village in Rajasthan that hosts broadband infrastructure sponsored by the Indian government's national broadband Internet policy initiative called the National Optic Fibre Network (NOFN) program, now renamed as BharatNet. Owing to the presence of this infrastructure, it also hosted pilot tests of two commercial service providers who offered free WiFi to the village for a year as part of the trial runs of their network. Separately, a village council WiFi network mounted on the broadband infrastructure has unwittingly turned into a public WiFi hotspot after its password became known in the village.

The study accounts for these different WiFi networks that have formed a part of the village's WiFi consciousness and locates the gendered politics of access and use by asking: "who gets to use the WiFi?" Through observations and interviews, it draws attention to the perspectives and experiences of women who are active smartphone and mobile Internet users, but still find themselves unable to access and use the different WiFi opportunities in the village, owing to gendered politics of space and mobility. The experiences of the women contrast with their male peers who report freedom and mobility in accessing WiFi networks along with being the default target users of WiFi trial runs. Additionally, it also presents the perspectives of a commercial WiFi service provider to understand what considerations dictated infrastructure deployment in the village and what shaped assumptions of who the users of these services might be. Together, the study argues that staking claims of bridging digital divides and last mile connectivity through WiFi networks can be disingenuous if infrastructure deployment does not also account for the gendered sociality of networks and spaces along with the architectural specifications of the technology itself.

2 RELATED WORK

2.1 WiFi and Space

There are two ways in which existing literature on public WiFi and space motivate the concerns of this study. First, research engaging with space, access, and use of public WiFi networks have usually centered around urban spaces in the Global North, such as cafes and parks, which largely describe users and their purposes in connecting to public hotspots [14, 15, 26]. Public WiFi networks have only recently started penetrating the Global South, and while there is emerging work around public WiFi in these geographies, they still tend to be situated in largely urban contexts [52]. Thus, there is little representation in the literature concerning WiFi networks in rural areas, even as WiFi services are increasingly penetrating rural habitats in countries like India [4, 46].

Defining what counts as "rural" space has been a matter of debate for geographers. They acknowledge that while the rural may be differentiated in the popular imagination vis-a-vis the urban through imaginations of formal representations of rural space, daily lives, and practices; a single umbrella definition of the rural is neither feasible nor desirable [23]. However, Halfacree presents a three-fold model of rural space that accounts for intersecting contexts and realities of rural life. He argues that rural life is socially produced and linked to production and consumption activities such as agriculture along with imaginations of rurality as represented in official documents by planners, politicians, cultural arbiters et al [24]. It is beyond the scope of

this paper to engage with debates on defining what characterises the rural space. Therefore, to establish the character and economy of the area where this study is located as essentially rural and agrarian, and following a village council model of governance, I defer to the 2011 Indian Census, which classifies Arain , Rajasthan as a village [20].

The second aspect of space pertaining to public WiFi literature is how public spaces have been studied and presented as being consequential in defining infrastructure, access, and use. Forlano's work offers novel insights into the relationship between public WiFi and space. She observes that WiFi networks cause an integration of the physical and the digital spaces in ways that reconfigure and regulate human behavior in tandem with the architecture of the space and socioeconomic factors [14, 15]. Building on this work, Dye et al draw attention to the various ways in which social norms, time, and human relationships are negotiated and undergo reconfiguration with the public space of the parks of Havana amidst emergent tensions of creating WiFi affordances [10]. Thus, while the interactions between WiFi networks and the spaces they pervade have been acknowledged, the gendered aspects of spaces and their relation to WiFi access and use have not been investigated. To ground this study's agenda in concerns around gender and public WiFi spaces, I thus draw on the technical affordances of WiFi and Doreen Massey's work [41, 42, 43] to define the interactions between public WiFi spaces and gender.

An essential feature of WiFi infrastructure is that it implicates and makes space salient as a 'hotspot' by delineating it as a location for Internet connectivity. Proximity to the access points of the network is a key determinant in receiving reliable connectivity within the range of WiFi signals and users work to position themselves in ways that will maximize signal reception. Hence, the public space that is bounded by the potency of WiFi signals and therefore a hotspot, is of especial concern to this study. However, WiFi affordances are not the only feature that defines these spaces. Massey notes that spaces rarely have unique identities and are susceptible to conflicts and difference that dictate how they are experienced and by whom [43]. Writing on the nature of public spaces, she notes that given their unregulated nature, it is often left to populations to negotiate and determine who gets the right to access these spaces in the absence of explicit rules. The outcome of these negotiations is predicated on what are often unequal social relations between different groups of people. These inequalities can exclude or weaken the right of presence of groups such as women, who in many domains continue to experience less power in relation to men [42, 43].

In India, accessing urban public spaces for leisure is often fraught with both ideological challenges to a woman's right to be in public as well as material obstacles in the form of inadequate infrastructure such as transportation facilities, street lighting, and public toilets [47]. Social media campaigns such as #whyloiter and #pinjratod (break the cage) have been constructed by feminist movements in India to highlight women's efforts to assert their unconditional right to public spaces without necessarily having a specific purpose that lent legitimacy to their presence [30]. Elsewhere, Jeffrey too draws attention to the fact that young college women in the city of Meerut in western Uttar Pradesh could not participate in 'passing time' in public spaces like their male peers since it was viewed as wholly inappropriate by their parents and society at large [31].

The arguments made in the context of metro cities such as Mumbai and smaller cities such as Meerut multiply manifold in the context of rural India. Here, women's access to public spaces is girded by socio-cultural dynamics which produce extremely restrictive norms on a woman's

presence outside her home. These norms also have various consequences for the representation of women in the public sphere. For instance, in India as in many other parts of the world, public spaces are still largely inhabited and populated by men. Among other things, this affects the political participation of women as politics has been observed to fundamentally be a public act irrespective of sex [7]. The restrictions that women experience on purpose, mobility, and presence in public spaces can thus also influence their access and use of community or public WiFi spaces.

2.2 Interactions between Gender, Space, and Technologies

None of this is to suggest that the spatial politics surrounding WiFi networks are the only technologies that complicate women's access to and use of Internet and communication technologies. Nor are these issues particular only to the Global South. Researchers have found that gender plays a dominant role in determining access and use of technology because it reflects structural inequalities that include a host of other factors, including spatial politics [49, 62]. Studies report that physical and social spaces regulate opportunities for the use of technology even in privileged Western societies, where women's access to communication technologies blurs understandings of public and private domestic spaces [39]. Technologies are used and accessed within social environments that are shaped by local and global histories, geographical conditions, and everyday social practices that dictate how access and use are consequently gendered [12]. ICTD literature has frequently drawn attention to the way gender dynamics influence the adoption and use of technology in various different contexts including public spaces such as telecentres, which facilitate Internet access [e.g. 45, 33, 59, 5, 22].

The literature around mobile phones and mobile Internet has also evaluated gendered experiences of technology in the context of the Global South. Recent work identifies a host of challenges that influence women's effective and meaningful use of phones and mobile Internet [3]. These include fears and experiences of sexual harassment, maintenance of devices, time demands, misinformation of social media, and personal characteristics of young girls including age and gender that dictate the extent to which mobile phone and Internet use can act as agents of empowerment for women [12, 25, 28, 61]. With increasing penetration of mobile phones, women, especially in India, are fast acquiring ownership of their own devices and developing sophisticated repertoires of digital literacies and mobile Internet use. However, owing to the confined lives that women lead, their experiences and voices remain largely hidden from people who do not intimately know their lives and lead to erroneous assumptions about how women use technology [34].

This study reports on similar observations about women's digital literacies. It illustrates that lack of digital literacy is not the only barrier to access and use, with tech literate women also experiencing inequities in Internet use if the peculiarities of their mobilities and spatial politics are not accounted for.

3 FIELD SETTING

3.1 Arain, Rajasthan

The research for this study was conducted in a village called Arain. In line with the Indian rural administration system, Arain, which is situated in Ajmer district in the state of Rajasthan in north-west India, serves as the block headquarters for around 21 villages in the Ajmer district. It

covers an area of around 36.22 square kms (13.98 square miles) and is located around 70 kms (43 miles) from its district headquarters in Ajmer and around 132 kms (82 miles) from the state capital, Jaipur. The nearest city Kishangarh, is one of India's largest commercial marble trading markets and is around 26 kms (16 miles) from Arain. Owing to its status as the block headquarters, Arain serves as the location for many administrative offices. It is also houses a primary health care centre, a police station, and a land records office, along with the state-run Bharat Sanchar Nigam Limited's (BSNL) rural telephone exchange. Branches of two national public-sector banks serve the financial needs of the population and its government schools provide education up to 10th grade. For high school and undergraduate education, students generally travel to colleges in Kishangarh or Ajmer. Arain is served by state buses that connect it hourly to Ajmer, which is two hours away by bus, and they are the primary means of transportation to the village. The shaded area in the map below, locates Arain in India.

Figure 1: Arain on the map of India. Image © 3Xk Creative Commons License

The fieldwork for this study was conducted as part of a 15- day long visit to Arain to study the use of the Internet provided to village councils as part of the NOFN policy initiative. The NOFN project first manifested itself in 2012 with three pilot sites chosen by the government to represent different geographical conditions. Arain block with 21 villages was one of the sites, along with Panisagar block in the state of Tripura in north-east India, and Parvada block in the state of Andhra Pradesh on the eastern coast of India. The pilot covered 59 village councils across the three chosen states. I visited all the three blocks in Rajasthan, Tripura, and Andhra Pradesh between May-August 2016. Primary fieldwork for this study in Arain was conducted in June 2016. Follow up interviews with the respondents were conducted during a second visit to Arain in March 2017.

3.2 Internet in Arain

As part of the NOFN pilot, Arain village has broadband Internet through both fibre optic cable as well as WiFi at three locations:
a. The BSNL telephone exchange, where the GPON (Gigabit Passive Optical Fibre Networks) and ONT (Optical Network Terminals) ports are installed.

b. The block headquarters that houses various administrative departments serving Arain and its affiliated villages. From here other state institutions such as the police station, the primary health care centre, and the land records office are provided horizontal connectivity through BBWT (broadband wireless terminal) devices
c. Both the block headquarters as well as the village council office also house two Common Citizen Service (CSC) centres where various e-governance services can be availed for a fee. The two CSCs are run by a village level entrepreneur (VLE) who often acts as the administrator and trouble shooter for minor infrastructural breakdowns.

Barring Internet infrastructure in these locations, there were no services or spaces, such as cyber cafes, that provided Internet or computer access to people either for free or on payment. Pratham, a well-known NGO working in the field of education conducts digital literacy classes for the children in Arain through its telecentre. It is a paying client of the NOFN infrastructure for a monthly fee of Rs. 7,000 (US$104) to provide WiFi for its classes. Students up to grade 10 attend hour long classes at the telecentre to use the Internet and attend distance education classes on Skype with teachers from various Indian cities. While reliable high-speed WiFi was available in the Pratham telecentre, its access was limited to children who would access the Internet on Pratham laptops. The children who visit Pratham thus exhibit a high degree of mobile device and Internet literacy.

The presence of NOFN infrastructure in Arain was also a draw for private players interested in harnessing the network to conduct trials for commercial provision of rural WiFi services. At least two different private for-profit WiFi solutions providers had conducted WiFi pilots in the village by providing free coupons that allowed users to access WiFi Internet within a range of 1 km (0.62 miles) from their base stations. Since these trials had now lapsed, people in the village were no longer able to access reliable WiFi Internet even though they indicated a willingness to pay for the WiFi because its high speed. My fieldwork in Arain also coincided with a visit from one of the private WiFi providers (hereafter referred to as Team WiFi) from Delhi including the managing director (MD) of its India operations. Team WiFi arrived in Arain to dismantle their infrastructure after concluding their year-long pilot project from early 2015 to March 2016 and I interviewed them during their visit.

Team WiFi oversees commercial WiFi operations active across four other states in India. They have 25 active hotspots in all with a user base of 60-70 active users per hotspot. They sell WiFi through the state owned BSNL and offer free Internet access for 15 minutes, after which a user must pay to continue use. Typically, users pay Rs.100 (US$ 1.55) for 1GB data that is valid for a month. According to the MD, people were paying for their service since they provided cheaper, faster, and more reliable access to the Internet than mobile Internet services that were often weak in rural areas.

3.3 WiFi Escapades in the Wild

In addition to the free WiFi pilot testing rolled out by Team WiFi and another service provider, both of which had concluded shortly before my visit; the three built structures with NOFN connectivity also had password protected WiFi that was meant to be used by staff members for work purposes. Given that the block headquarters was staffed by many residents from Arain, the password to the WiFi network inevitably leaked with the result that almost everyone in the village with an Internet enabled device could access WiFi in the vicinity of the three buildings. The state of WiFi connectivities meant for staff members of government offices differed in the three states I visited. In Panisagar, Tripura, the RailTel staff responsible for the project in the

state suspended the WiFi router at the block office after the password leaked in ways similar to Arain's password leakage. In Parvada, Andhra Pradesh, the block office has a functional WiFi and the staff has succeeded in keeping the password confidential and closely guarded. Thus, it was only in Arain, Rajasthan that I found the WiFi password freely circulating in the village and actively being used for Internet access. It was also only in this site that I found private players testing their WiFi services. Thus, this study reports data only from Arain. It is worth noting that Team WiFi was unaware about the free WiFi hotspot arising from leaked password in the village. Villagers and participants in the study too could not accurately recall if the password had leaked before or after the pilot trials and offered conflicting histories of WiFi presence when attempting to date the different networks in the village.

Kaye [32] observes that decisions around password sharing practices are generally engaged in with a lot of nuance and care. People who share passwords often rationalize their decisions as morally right even if it is in violation of formal rules governing the sharing of resources. While Kaye's study was particular to people's personal passwords, the WiFi network password in Arain came to be appropriated as a public resource that was shared and made available for use mostly by young boys and the men of the village as a form of peer solidarity in their quest for free and reliable Internet. The release of the WiFi password into the village caused a great deal of consternation among the staff at the block headquarters - the most popular site among the men to access Internet since it has comparatively better speed than the other two WiFi sites in the village. WiFi networks are unpopular among network administrators because they are fairly invisible and untethered from the controls of cables and switches, which make them particularly susceptible to illicit and deviant activities [40].

In Arain too, the annoyance of the VLE is particularly acute since he finds the already unpredictable speed of the NOFN network, slowing down considerably due to indiscriminate WiFi use by the villagers. The VLE and the staff members at the block also expressed helplessness in their inability to reset the password due to limited technical knowledge of the working of the ONT device. Consequently, the vicinity surrounding the block headquarters at Arain now functions as a free WiFi spot. The study thus reports on the different types of WiFi networks that the village had experienced in accessing and using WiFi. In the next section, I discuss the conditions which shaped the fieldwork for the study.

4. SELF-DISCLOSURE

Methodological reflections on fieldwork have acknowledged the ways in which women researchers find their gender shaping the relations they form with the people in their field sites and its influence on the research process and its outcomes [38]. Similarly, the data reported in this paper also draws upon my own reflexivity of my fieldwork experiences and was integral in how I could construct the field and draw participation from both men and women. Researchers and respondents bring different forms of sexism and gender aspirations to the research encounter arising from cultural differences based on gender, education, class, religion, etc. This can result in situations that are fraught with misunderstandings and disagreements, but at the same time also offer opportunities for dialog, introspection, and personal and social change on both sides [6]. Thus, in describing the site I offer reflexivity and transparency about my own experiences in the village since it influenced the fieldwork for this study and the questions I found myself asking about WiFi access.

Having encountered the presence of an accidental and unwitting 'public' WiFi network in Arain, I spent time hanging around in the hotspots where the men were most likely to visit for

Internet access. Initial attempts to approach the men at the hotspot were unsuccessful because they would leave when approached or simply refuse to talk. The first time I succeeded in talking to a group of male users was in an abandoned structure adjoining the school behind the block headquarters. The men were startled by my presence since it was considered disreputable for women to be seen there and were perhaps too surprised to leave. I told them that I was hoping that they would assist me in accessing the WiFi network and that my mobile data pack had slowed down. As my mobile Internet was operating on patchy 2G speeds, this was not untrue. The men shared the password and it led to a conversation that allowed me to introduce the research agenda that had brought me to Arain. On another occasion, I encountered three male college students trying to get on to the WiFi network to check their exam results, but failing to locate their names on their university's website. I offered help in identifying their results and to express their thanks, they in turn facilitated introductions to their friends and acquaintances.

The dominance of men accessing the WiFi was an obvious and hard to ignore feature of my sample. It was also difficult to find young girls or women with access to mobile phones or any Internet enabled device since they weren't present around the block headquarters in the same ways in which the boys were. I was confronted not only with a complete absence of women accessing the public WiFi at Arain, but also the absence of young women from the visibly present population who could be approached for conversation and friendship. The village also had no spaces that served as casual hangouts for women where I could meet them.

Consciousness of my gender as a women researcher, who, although an Indian, was an urban dweller from the southern part of the country and thus an outsider to the cultural and social contexts of Arain was an omnipresent feature of my fieldwork. While verbal and non-verbal micro aggressions and occasional non-cooperation in sharing information from both government and non-government officials in Ajmer and Arain would play out in different forms, it was most stark when I was denied boarding facilities by hotels in Kishangarh, the nearest town to Arain, on account of being a single unchaperoned woman. Sharing this incident with people in Arain would often elicit agreement with the hotels' decisions because a woman traveling alone was viewed as inappropriate conduct. In other instances, I would be reprimanded by elderly male staff members at the block headquarters who found my hanging around in the public seating area undesirable behavior for a woman and I was frequently warned that it would reflect poorly on my status in the village.

Gender inequality was a part of everyday life in the community. In Arain and its affiliated villages, it was very common to find invisible women sarpanches (village council heads) who were elected owing to affirmative action policies for women, but whose husbands would discharge all duties and responsibilities on their behalf. While this practice has been observed in other Indian states as well [19], I was particularly unsuccessful in meeting the woman sarpanches in Arain because male family members would repeatedly stall attempts at contacting them. According to the 2011 government census survey, Arain recorded a population of 7,353 with women numbering 3,649 and only 24% of them reported to be literate [20].

The lack of boarding facilities in the village made it necessary to undertake a daily commute from Ajmer. The routine of commuting from Ajmer city to Arain using the state buses also contributed greatly to socializing me to the daily rhythms of Arain through conversations with fellow passengers and the simple quotidian experiences of sharing public transport with them. Midway through fieldwork, a woman worker in the block office whom I befriended offered to share her living quarters with me since she was widowed and lived by herself. Her offer enabled a night's stay in the village and allowed me to spend more time with the participants. However,

extreme summer temperatures and frequent electricity outages rendered this arrangement impractical to sustain.
In a bid to foster connections with women, I began walking through the living quarters of the village to expand on my presence from the area around the block headquarters which was my usual 'field site'. These walks allowed me to explore the everyday lived spaces of the average Arain resident and also find women to talk to. The public spaces rarely had any young women visible although middle aged married women were sometimes spotted working in the cattle sheds adjoining their homes. During one such walk, I met a young girl dressed in a pair of jeans and a T-shirt accompanied by an elderly female relative. Surprised by the girl's attire, which was unusual for Arain, I stopped and introduced myself to her as a professor from a major city in southern India who was in the village to study Internet infrastructure and in search of women Internet users. The girl and her relative were willing to hear me out. She said that she had only just completed her high school exams and invited me home to speak to her elder sister who had completed her college education and was a regular mobile Internet user.

The entrée into the home of these sisters and my welcome by their family was serendipitous in snowballing women in my sample. My acceptance by the parents of the sisters was boosted when the two older brothers of the women said they were aware of my presence in the village on "internet work" as I was being discussed by many people in Arain. This alleviated the apprehensions of the parents and allowed for discussions with the entire family about life in the village. The sisters were curious and enthusiastic about interacting with a woman who was in Arain on research work. Given their familiarity with the Internet and their need for it in their everyday lives, they also agreed to assist in snowballing other women of their acquaintance for the study.

5. PARTICIPANTS

The proposal and ethical considerations surrounding this study were reviewed and approved by a panel at The Hindu Centre for Politics and Public Policy that funded this work. Consent was secured from all participants by first explaining the purpose of the research and the interviews would begin after they agreed to participate in the study. The sample of interviews and intercepts that form a part of this data are derived from interactions with 20 people. They include interviews with 6 women and intercepts with three groups of men that brought in inputs from 14 individual men in all. Closely reflecting the age and education demographic of my first and primary woman informant in Arain, all the women barring one, were in the age group of 22-24 years old and unmarried. The married woman was 29 years old, mother to a two-year old child, and worked as a teacher. All the women participants held at least a bachelor's degree, typically in the social sciences and humanities, and some were pursuing their Master's degrees while working as teachers. Their job aspirations extended to securing a teaching position in a bigger school or getting a government job. One woman held a Master's degree in Commerce and was assisting her father in running their family-owned grocery store. All the women whose interviews form a part of this study were drawing a salary that afforded them access to both budget smartphones as well as money to buy mobile Internet data packs. All the women participants displayed a high degree of comfort with smartphones and the Internet that young women in their 20s have been observed to have [34].

Male participants ages ranged from 16-22 years. Younger boys whose ages ranged from 8-14 years old were also frequent visitors to the hotspot. Although interactions with them were not a part of their formal interview process, their presence was indicative of the tremendous

popularity of the WiFi network among males across ages. The sample included school dropouts to college students studying social science subjects. Employment activities of those who were working, ranged from shop assistants, truck drivers, and construction equipment operators. Lastly, I also interviewed the managing director of Team WiFi to understand how his organization understood space and gender interactions when deploying their WiFi services in rural India.

Table 1: Description of Participants

	Age	Sex	Education	Marital status	Own income
G1	22	F	MA	Unmarried	Y
G2	22	F	BA	Unmarried	Y
G3	24	F	M.Com.	Unmarried	Y
G4	23	F	MA	Unmarried	Y
G5	23	F	BA	Unmarried	Y
G6	29	F	BA; B.Ed.	Married	Y
B7	16	M	High School	Unmarried	N
B8	18	M	BA, 1st year	Unmarried	N
B9	18	M	Dropout	Unmarried	Y
B10	20	M	Dropout	Unmarried	Y
B11	16	M	High School	Unmarried	N
B12	22	M	BA	Unmarried	Y
B13	21	M	Dropout	Unmarried	Y
B14	18	M	BA 2nd year	Unmarried	N
B15	20	M	BA 3rd year	Unmarried	Y
B16	22	M	BA	Unmarried	N
B17	19	M	BA, 2nd year	Unmarried	N
B18	18	M	BA, 2nd year	Unmarried	Y
B19	19	M	BA, 2nd year	Unmarried	Y
B20	22	M	BA	Unmarried	Y

5.1. Sample Limitations

Given the highly gendered and conservative social life of the site in which I was conducting fieldwork, the sample size of informants for this study is small. However, the 'in the wild' nature of a part of this study allows for a rich and detailed understanding of the social and spatial contexts that render a deeply gendered perspective on the way public WiFi Internet can be accessed and used. Crabtree et al [8] counter traditional insistence on large sample sizes and spending long hours in the field as the only way of making generalizable claims, and instead urge attention towards uncovering the underlying arrangement of social and collaborative activities that people engage in as part of their everyday interaction. They argue that because the 'machinery of interaction' that dictates these activities draws from a shared cultural resource that orders activities, even a single instance of how the everyday is arranged by people can serve as a generalizable case.

The sample is also composed of men and women who were available to speak to me during the hours that I was present in the village. It thus comprises mainly the younger residents of the village who did not have work or study obligations that took them away from Arain during the day. I also learned from the participants that older men aged 25 and above visited the WiFi spot either early in the morning or late at night as they were either at their workplace or busy tilling their agricultural landholdings to prepare for the sowing season during the daytime. Some participants also cited the intense summer heat as a reason for many men visiting the hotspot only during late evening and early morning hours. Similarly, meetings with some women who were potential participants in the study could not be arranged since they were available only in the evenings when my presence in the village was untenable owing to the last scheduled departure of the state buses at 18:00 hours every day.

6. METHODS

The data reported in this study has been drawn using qualitative methods and takes the form of formal interviews, intercepts, and informal interactions with participants. The interactions with respondents would last for anywhere between 10 minutes to an hour, but I would also encounter some of the respondents - especially men - multiple times through the day, leading to regular exchanges with them. This made it possible to become familiar with details about the lives along with contexts of access and use. Sometimes, conversations and interviews with the boys occurred as intercepts. This means that they were interviewed while they were accessing the WiFi network, resulting in 'in the wild' encounters at the WiFi sites. Meetings with the women, on the other hand, were pre-planned sessions of formal interviews that took place inside their homes or at the homes of the sisters who were helping me with the study. The interviews with the women were thus less naturalistic in comparison with the men. This again reflects the gender dynamics that govern access and presence in public spaces that is the central concern of this study.

Initial questions to the participants centred around the kind of phones they were using, money spent on accessing the Internet, preferred things to do when online, strategizing Internet use when purchasing data, and time spent on the Internet. Recognizing that access and use scenarios were gendered, the questions also probed the comparative nature of gender differences. These included participants' use of public spaces, their preferred spaces for meeting with friends, and sources for technology related concerns. For the men questions about how they strategized the use of WiFi spaces in the village and their experiences using the free WiFi

during the trials of the commercial service pilot projects were also included. All interviews were conducted in Hindi, a language in which both my informants and I had native fluency.
Data was recorded in the form of handwritten notes and photographs. Some conversations and interviews were audio recorded with the permission of the interviewees and transcribed. Additionally, the interviews and intercepts in this study are supported by a rich corpus of observations that were gathered through hours of 'hanging out' at various sites in the village other than the WiFi hotspots. These included the block office compound that hosted a bank and various government offices, the two CSCs, frequent walks through the market, the school adjoining the block office, and shops along the main bazaar that served tea and snacks.

6.1 Data Analysis

The analysis was guided by the principle of constant comparative analysis [56] to yield the conceptual themes that are discussed as findings in the following section. During fieldwork, observations and insights from conversations were shared with all participants for their comments and were written or typed as field notes every day. The formal analysis of the data began with transcribing recorded interviews and typing the notes from handwritten interviews along with the field notes and memos to enable a clearer reading of the data after ending fieldwork and achieving distance from the field. The interviews and memos were read numerous times and later iteratively coded thrice to identify broad themes. These themes were further refined and labelled into categories in ways that help represent the study's main findings.

7. FINDINGS

7.1 Experiencing Space, Experiencing Internet

Participant interviews consistently brought to light the dramatically differing relationships that women and men held with public spaces in Arain, and the ways it influenced their access and use of the WiFi network. It illustrates Massey's observation about spaces and places and people's sense of them being thoroughly gendered in varied ways. As other studies have also reported, the most evident way in which this gendering of space is noticeable is through the invisibility of women in public spaces [29, 34]. The women in Arain were themselves aware of their invisibility to visitors. For instance, demonstrating reflexivity on how an outsider to the village may immediately be struck by the conspicuous way men were using the Internet, G1, the first woman participant recruited for the study said,

> *"Women use the Internet. It is just that our use will not be visible to outsiders and casual visitors because we are indoors at home. Our use is only through mobile Internet and not on the WiFi access points in the village that are all outdoors."*

Concerns about visibility and mobility were part of everyday life for the women who pointed to the undesirability of attracting any kind of 'talk' based on people surveilling their movements. Hence, in some ways women themselves did not desire being visible as it could bring them in

conflict with the social norms of their community. G2, who occupies a place of distinction in the village for running the operations of her family's grocery store despite being a woman said,

> *"In our village, where girls go and what they do is not something that only concerns a girl or her family. It is almost as if the entire village participates in determining our movements. The males don't experience these constraints. After my grade 12 exams, a lot of people in the village advised my father not to send me to college since it would mean an hour-long bus journey to Kishangarh every day. They all said this could cause trouble for my family because I would be stepping out of the village boundaries with nobody to monitor me. Similarly, to access the free WiFi from the office, I would either have to go to the office or the open grounds behind it. It is considered disreputable for women to be seen around these places and I will have to deal with a lot of people talking and asking me about my presence there. Who wants to deal with that?"*

Women also displayed an acute sense of space-time interactions that determined which spaces they could only *visit* as opposed to *lingering* there. This distinction is particularly important because WiFi use is a spatial and temporal activity that requires users to be within the bounded space of coverage to be able to use it. As B10, a male respondent who worked as a shop assistant in Arain said,

> *"Once you get on to the Internet, you can't really get off immediately because you are also doing a lot of things at one time. I begin conversations with friends on WhatsApp, I lose track of time on Facebook. You need to sit down and give Internet access the time it needs. We can easily spend 2 to 3 hours at a stretch when we get on to the WiFi."*

For women, lingering was usually a function and character of the space itself. Reflecting on her use of public spaces in the village, G3 who was studying for a master's degree in History said,

> *"I am able to visit the post office, but I will not be able to linger there because you are expected to finish your work and leave. However, I can linger at the temple without being unduly worried about what people would say even though men are present there. I can also linger at the bus stop because that is what the space is meant for. However, neither the temple nor the bus stop has WiFi coverage. Other than these two public spaces, the only other space where I can be completely comfortable is maybe the girls' school in the village because men are not allowed inside there."*

Space and time mobilities often had an impact on the kind of activities that women could indulge in. G1 and G4 expressed how their longing to go for a morning walk in the village was often unfulfilled because they always had to plan for it in advance and ensure a male member was available to accompany them. They said,

> *"Going for a morning walk is not a simple thing for us. We want to be regular walkers for health reasons and because we enjoy it, but this is not always possible."*

In contrast, social anxiety and concerns about mobilities were not expressed by the men in this study and they reported spending as much as 2-3 hours at a stretch accessing the WiFi at the

block office or going in search of better Internet speed at the other two WiFi sites in the village. Not only did men spend more time using the Internet, but they were also able to access the Internet at different times in the day and night thus maximizing their WiFi use. They were also adept at strategizing their use of space to receive better signal by climbing trees and scaling walls or simply by hotspot hopping across the three WiFi sites in the village. Early morning and late evening hours were highly preferred by the men both due to availability of leisure time and faster Internet speeds owing to the off-duty hours at the block office. B12, a 21-year old male farmer said,

> *"I come for WiFi early in the morning to avoid the summer heat and then head to work on our field for the rest of the day."*

B14 who had also received coupons to use both the pilot WiFi services during their trail runs said,

> *"I miss the pilot trial days. The connectivity used to be very fast and reliable, and I could sometimes catch their signal at home too. These days, I walk around the block or go to the BSNL exchange in search of decent speed. I managed to get the password at the BSNL exchange, but prefer the Atal Seva Kendra since it is also shaded by trees around there and therefore more pleasant."*

Fig. 2. Men in Arain scaling boundary walls for better WiFi signal. Image © Preeti Mudliar

The constraints on mobility and constant surveillance in Arain along with a reluctance to interact with men from the village has also led the women to look at Kishangarh as an alternative space to pursue leisure and work activities. G4, who holds a bachelor's degree in

sociology, observed that unlike men who could pretty much occupy any part of their village and spend time hanging out with their friends, women needed spaces that were cultivated for the express purpose of meeting other people, such as restaurants and parks, to be able to spend time with their friends. Given that Arain had no public space of this kind, all women said that they conducted their leisure and social activities either at each other's homes or in Kishangarh since it hosted their colleges and also had restaurants they could visit. The women frequently expressed preference for Kishangarh as a place where they felt more comfortable not only for leisure purposes, but also to engage in Internet related work such as visiting the e-mitra centres that facilitated e-governance tasks. G5 who was a teacher said,

> *"Although there are plenty of e-mitra centres here, I don't like visiting them because the men stare. I feel more comfortable in Kishangarh since it is a bigger town, and nobody knows me there."*

Recalling her experience at the village's Atal Seva Kendra, G1 said,

> *"When the kendra was first opened, it offered free Internet service to the village. I went there once to try it out and a man there was very rude to me. He passed snide remarks saying," look they have all come here for Internet only because it does not cost them." He also did not allow us to interact with the machine freely. You can only learn if you fiddle around with stuff, but he was constantly watching over us. I never went back. If I need to access Internet for work purposes, I would rather do it at Kishangarh."*

As Massey notes, different social groups and individuals develop different spatial mobilities that depends on their capacity to either shape, be shaped by, or imprisoned by the flow of communication and connections around them [41]. In Arain, women reported feeling helmed in, surveilled, and vulnerable to harassment, which did not allow them to use the public WiFi hotspots. The same spaces, however, offered Internet opportunities for men who strategized and harnessed the availability of WiFi for their needs. An interesting outcome of this severe gendering was that women reported only having 'heard' about both the free WiFi in the village as well as the trials or 'seeing' people using the WiFi in contrast to men who actually used the service. G2 said,

> *"When the boys come to my shop, I often hear them talking about the WiFi and making plans to spend time there. That is how I had found out about WiFi in the village."*

G6 echoed her and said,

> *"I would often see these school boys clustered around the block office. I once asked them what they all did there every day and that is when they told me about the free password for the WiFi."*

Four women in the sample said that while they were aware of the free WiFi at the block office, they were unaware of the WiFi pilot runs that were offering free coupons for use. Unlike these four, the other two women who knew about the pilots had brothers who had participated in the pilot trial run and had reported their WiFi experiences at home.

Women did not report learning about the Internet or technology from their women friends and instead relied on male relatives they had close ties with or their brothers if they had male siblings. G1, who had two elder brothers shared that she juggled two SIM cards at 90-day intervals because her brother had showed her a way to strategize spending on the Internet. She said that he had figured out that telecom service providers generally offered better deals on mobile Internet data packs after 90 days of non-use by a subscriber. She said,

> *"My brother juggles his mobile Internet use between four SIM cards. He has one from every service provider, so he suggested that I get two for myself too. That way I can alternate between the two and get good deals for myself to stretch my budget for data."*

Interestingly, all the women who were interviewed said that in their view having brothers or other close male relatives also made them better informed about technology choices in comparison to their women friends who did not have male relatives because their male siblings were willing to answer their questions and help them use the Internet. They attributed this to the fact that their brothers had more access to information about technology because of lesser curbs on their movement and more frequent meetings with their friends. This is similar to findings from urban India which reveal that women may tend to defer to men in matter of technology adoption and approval [52].

For women in Arain, access to the public spaces in their village were thus subject to a variety of social constraints that prevented them from accessing the WiFi networks in their community. Was it likely that a WiFi service provider interested in beginning commercial operations in Arain would know of these restrictions?

When asked about the considerations that drove the roll out of their pilot WiFi service, the Team WiFi MD revealed that it was mainly the infrastructural features and population density of the space that determined the location for their WiFi. Describing the deployment process, he said,

> "*We do an initial survey from an infrastructure and ecosystem point of view. We first assess where the BSNL tower is located and the backhaul availability. After that, we try and find a space for the hotspot such that it gives us 360-degree coverage. This means that ideally the hotspot should be in a central place in the village such as the gram panchayat office, post office, bank, dispensary, or school so that there is habitat all around that can use the WiFi."*

Probed about the role that gender considerations may have played in deciding the location of the hotspot, he said,

> *"We don't have data on our users' gender nor have we conducted studies to assess gender differences in access, but I don't believe that gender is relevant. To access WiFi, you need a smartphone, not your gender."*

When told that this study had revealed gender disparity in both access and information about the existence of both the accidental WiFi hotspot as well as Team WiFi's free trial in Arain, the MD shared that since they relied on word of mouth information about their pilot, it was likely that only men were aware about the trial and had access to the free coupons. According to the VLE who acted as the coupon distributor for both Team WiFi as well as the other pilot, the

company had distributed approximately 400 coupons in all, but the limited coverage area meant that only users who were men would gather around the BSNL tower to access WiFi. The VLE said that the coupons were normally distributed to people he was acquainted with and their friends, and admitted that it wasn't an equitable distribution through the village. Neither company engaged in a publicity of their WiFi trials nor did the VLE personally know of women users for both the pilot projects. Said the MD,

> *"In Arain, our rollout was limited to a radius of 500 meters radius around the BSNL tower where we got backhaul, but I don't think that gender is significant in any of our other sites too. If true, then I welcome user studies that will help us address gender disparities if they exist."*

The perceptions of Team WiFi's MD reinforce that people believe what they have had a chance to see. Men who are peripheral to a community, do not have adequate knowledge of the lived experiences of the women belonging to that community nor do they have opportunities to learn about the technological practices of these women. This is because of their relative seclusion from public life and social taboos governing interaction with men [29, 34]. The MD's assertion that access and use of public WiFi was dependent on possession of a device and not gender, is reflective of an implicit assumption that ICTs are gender neutral. This assumption conflicts with the findings of this study that demonstrates stark gender differences in the way men and women used space, time, and money in accessing and using Internet. While it is encouraging that the MD is open to revising his belief about differential gendered access and use with evidence, it also reveals how gender considerations may not be reflected in the way WiFi infrastructure in rural areas are set up because of the technology deterministic belief that access to devices is a sufficient condition in mediating access to WiFi hotspots. This leads to an unwitting perpetration of a gender divide. It can also be inimical to the service provider's own commercial interests that would be better served if women are recognized as potential paying customers by being sensitive to their perceptions and use of space and place.
Next, I present findings on how differential access to the Internet can influence usage.

7.2 The Gendered Internet Mobile Data vs. WiFi – How does usage differ?

Both men and women in Arain were unanimous about the slow and unreliable speeds for mobile Internet across all service providers. The women wished for opportunities to access the WiFi since they had heard of the comparatively superior Internet experience that it offered. Men who had used the commercial WiFi during its free test trials expressed a desire not just for the free WiFi in the village, but also a willingness to pay for WiFi if it was made commercially available to them. B1, a male participant who was studying for degree in Sociology said,

> *"I find the prepaid mobile data really expensive relative to the experience it offers. I am paying Rs. 199 (US $ 3) for 1 GB of data at 3G speeds, but we are practically operating on 2G speeds on our data packs, which is why I come here for the free WiFi. The data plans that the WiFi providers had discussed with us during their trials had offers such as 1GB data at Rs. 100 (US $ 1.52) and I would rather pay for a good Internet experience."*

The degree of access to the Internet influenced the kind of usage and spending patterns for Internet access between the genders. Both men and women typically reported spending between Rs. 6,000 – Rs. 10,000 (approximately US$ 90- 150) on purchasing Android

smartphones. The brand names of their phones that they used were lower end models from Gionee, Micromax, and Samsung. On an average, the women would spend between Rs 155- Rs 200 (US$ 2.30 – 3.00) depending on various schemes offered by different service providers that would get them 1GB Internet at 3G speed with 28 days validity. They reported being very conscious of how they were using data since it was a significant cost for them. G6 who was preparing for competitive exams in pursuit of a government job likened her strategic use of very slow mobile data to "*kheencha taani*" a Hindi phrase meaning a 'tug of war'. The boys however shared that they did not buy Internet very often since they had access to the free WiFi hotspot and some of them, especially the school going boys did not even have a SIM on their phones. While some males in the study were still students and had no independent source of income, even the employed males reported very infrequent recharge of mobile data. B13, who worked as a JCB machine operator said,

> *"I can't afford to buy a smartphone, forget buying mobile data. In fact, I don't even have a mobile number. I am using an extra handset that I managed to get from a friend only to access the free WiFi here."*

Men and women reported different uses of the Internet. While everybody used WhatsApp and Facebook to keep in touch with their network, the men consumed more entertainment content using the WiFi than women, by watching and downloading videos from YouTube or searching for links that would enable them to download pirated copies of songs and films. They also explored the Google Play Store very frequently to download apps. Two groups of boys shared that they would download and consume soft pornographic content very frequently. In contrast, women reported more instrumental uses of the Internet. They said that even though they wanted to access more entertainment and leisure content, they restricted their use to looking for education and employment related opportunities. G4 said,

> *"It has become a status symbol to be on WhatsApp and Facebook, so I save my data to communicate with my friends and family on these platforms. There are no cinema halls in Arain and I would really like to download films and songs, but that is not possible with the slow speeds on my data pack. Moreover, I also use the Internet to browse job opportunities so even though I want to access entertainment content, I do not."*

Women also reported that it was difficult for them to update apps or the software on their phones since the 3G Internet speeds on their data pack were often spotty. Further, software updates also resulted in a lot of data consumption that was often unaffordable in their monthly budgets. Hence, they often sent their phones with male relatives to places with WiFi coverage to update software. Women also shared more anxieties about going off the grid and becoming disconnected from their network when their data was exhausted. G6 said,

> *"Sometimes it creates misunderstandings among friends because I can't reply to messages on WhatsApp or Facebook when data runs out and it becomes difficult to understand the reason for someone's non-responsiveness."*

G1 also attributed anxiety due to disconnection given their confinement at home. She said,

> *"It is really not possible to venture out and catch up with friends. Whenever, I have data, the phone is my way of staying connected. I enjoy browsing and reading different things, but struggle with low speeds. I also enjoy sharing mehendi (henna) designs with friends and listening to songs. I am very fond of dancing and would like to be able to access videos on YouTube, but the 3G speed is really not conducive to downloading and neither is 1GB of data sufficient."*

All the women reported using the mobile data of other household members who were usually males, to accomplish urgent tasks if they exhausted their own data. G3 said,

> *"I use my husband's phone as a hotspot and access the Internet through that when I finish my data pack."*

Internet use was also a very social event for the men who usually came in pairs or groups, thus lending a very communal nature to their access and use. Male participants reported that the WiFi hotspot also doubled up as a leisure hangout for them. The socialities that were an integral part of their WiFi access facilitated peer-to-peer digital literacy and learnings among their groups. For instance, B10, an undergraduate student of Economics shared how he learned about Xender - an app, that he could use to share songs and videos with friends. He said Xender allowed each of them to download different songs and then share it among themselves to make better use of their Internet time. B15 who first used WiFi after getting a Team WiFi free coupon said,

> *"I learned about Xender due to the other boys who come here. So, I downloaded it from the Play Store and now use it to extensively share videos with my friends."*

Another group of boys shared how they learned about downloading apps of various telecom and service providers would get them at least 100 MB of free data if they installed the apps on their phones. B8, an undergraduate student of history said,

> *"I learned about the availability of free Internet here along with the password because I would see boys hanging around here and walked up to see what they were doing. In fact, my Facebook account too was created by one of the boys here because I didn't know what to do to get on Facebook. When we come here for Internet, we also discuss and share various things and I think I am reasonably well informed about the Internet now."*

These findings echo observations that WiFi hotspots can emerge as sites of informal interaction, social support, collaboration, and innovation [14]. In addition to providing Internet connectivity, the role of the hotspot space in Arain was akin to what Fisher and Naumer call as an "information ground" owing to the social sharing and learning it fostered for the men who gathered to access WiFi [13].

8. DISCUSSION

The findings of this study highlight the ways in which gender and space interact to produce very different mobilities and rights to public space for men and women. The differing mobilities

influenced the options that men and women could exercise to access the Internet and eventually their use. The dependency of women on slow and unreliable mobile Internet leads them to strategize, ration, and deploy their available data to very instrumental uses even though they would like to use the Internet for leisure and entertainment purposes. These findings mirror results from previous CSCW research where conditions of scarce Internet access led people to instrumentally use their available data [9]. Again, echoing previous findings of usage behaviour in conditions of fast and reliable Internet connectivity [51], the men in this study reported being able to harness WiFi availability in the community to fulfil their entertainment purposes among other things. These findings also point to the different ways in which discussions on gender in the digital divide need further elaboration because even as access and use of the Internet widens to include more women, other divides such as a gendering in the quality of access may take their place [37].

Based on the findings, this study urges attention to three aspects of public WiFi networks that can aid in making community access and use more equitable with regard to gender. First, the assumptions about WiFi infrastructure as an inherently neutral infrastructure can be misaligned with the realities of accessing public WiFi. Scholars discussing the materialities and affordances of WiFi observe that to the casual eye, the ostensible lack of WiFi infrastructure can make the technology appear ethereal, unremarkable, and almost invisible [14, 15, 40, 60]. As an infrastructural form, the WiFi network has thus lent itself to utopian imaginations of being a democratic infrastructure that privileges freedom, mobility, and sociality along with connectivity [40]. In practice though, WiFi networks are equally sites of spatial, political, and cultural contestations that host frictions and tensions in daily practices and routines. Their network manifestations are visible hubs that reveal the geographies of their transmissions, digital divides based on socio-economic demographics of cities, and are potent agents in the way they reconfigure interactions and relationships between people and spaces [10, 14, 15, 21, 40, 60]. As Larkin notes, apart from their technological affordances, infrastructures also exist as semiotic and aesthetic vehicles and therefore may be addressing only selective subjects with their orientation [36].

Second, democratic assumptions about the nature of WiFi may lull service providers into neglecting concerns about gender and space when deploying hotspots. Given their absence from visible public life, women may appear to be invisible in their access and use of the Internet to a casual observer or to Internet and WiFi service providers, who tend to be male, and thus not always well versed with the nuances of women's technology needs and habits. Some perceptions of women may be owing to social constructions of how women are viewed in relation to technology. For instance, a discourse analysis of the ICT policies of 16 countries in South and Southeast Asia revealed that women were repeatedly constructed as victimized, motherly, untapped resources, and as people different from the population that usually comprises men. These constructions persist and influence how design and implementation of technology that is wrongly ascribed to be gender neutral [2]. Other reasons for erroneous perceptions owe to the challenges of being able to access women and the practices of their daily lives, as illustrated both in this study and acknowledged in ICTD literature [29, 34].

Some of the ways in which WiFi service providers can help address access and use challenges is by ensuring diversity in their workplaces and including women in their deployment teams to enable interaction with women. Team WiFi had no women in its team and was completely staffed by men. The presence of women may have allowed the team to explore and understand the gendered nature of spaces in the community and how they are relationally bound to different segments of population [27]. Alternatively, service providers could also

interview men about the technology needs and practices of the women in their households. As this study demonstrates, brothers are often valuable allies to their sisters' quest for digital literacy and access to the Internet. Therefore, while women's needs and practices appear invisible to an outsider, they are often well known to men within their own families. Directing questions of gendered patterns of access and use to men can also potentially serve as a reliable information source on women's technology needs.

Third, since governments and regulators are also prominently involved in framing and guiding digital divide initiatives, such as the TRAI is in India, they could also extend their attention to social inclusivity and frame conditions that WiFi service providers must adhere to. For instance, while TRAI lays out very specific instructions for WiFi infrastructure, it provides no guidelines or recognition of the social dynamics that can influence technology use. Future regulations can include mandating service providers to remain sensitive to gendered notions of space and practicing inclusivity in the spaces where they deploy WiFi services.

Finally, the nature of WiFi enabled spaces that have the data hungry flocking to inhabit and linger within its radius, raises questions about how the nature of spaces that women now deem accessible could potentially be altered and reconfigured if WiFi were to be deployed. Would it further marginalize and restrict women's mobilities and opportunities to linger if men began colonizing these spots to use WiFi? It is a pertinent question with significant implications for women's access and use of public spaces. However, it is also one that can only be answered in future research work when public WiFi is equally accessible in the first place.

9. LIMITATIONS

This study draws data from multiple sources and contexts. Although the interviews refer to other WiFi hotspots that were active before this study began, its primary observations are grounded in an accidental WiFi hotspot that has assumed the nature of a free public WiFi in the village. The study sought out women in the village to understand their perception, use, and access to public spaces, WiFi hotspots, and the Internet in comparison to men. It also draws from an interview with a WiFi service provider who conducted a year-long trial run providing free WiFi. The sample of informants is small and not always comparative on similar metrics. However, the findings from this study provide insights on the spatial and temporal attributes of Internet use that have implications for the way women access and use the Internet. Future work will include extending this study by conducting research in rural sites where public WiFi hotspots are active to examine gender dynamics implicit in their access and use.

10. CONCLUSION

This paper privileges rural experiences of space and gender around public WiFi hotspots that are fast penetrating India as a viable way to broaden access and use of Internet. It also allows for an examination of the spatial choices and gender assumptions that service providers may be making when deciding on hotspot locations. While WiFi hotspots are perceived to offer reliable and high-speed Internet connectivity, the location and design of the hotspots can easily exclude women from access and use. It thus adds to the conversations around public WiFi access and use by a) focusing on a rural setting and thus offering an interpretation of public spaces that can be even more gendered than urban geographies in the Global South, b) applying a gender lens to WiFi access and use by accounting for active women Internet users who may be overlooked

when deploying infrastructure, and c) detailing the infrastructure considerations that a WiFi service provider makes when setting up service. Together, it interrogates assumptions about gender and use of WiFi hotspots that are ostensibly public in nature.

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