"DISADVANTAGED IN THE AMERICAN-DOMINATED INTERNET": SEX, WORK, AND TECHNOLOGY

Catherine Barwulor
Clemson University
cbarwul@clemson.edu

Allison McDonald
University of Michigan
amcdon@umich.edu

Eszter Hargittai
University of Zurich
pubs@webuse.org

Elissa M. Redmiles
Microsoft Research
& Max Planck Institute for Software Systems
eredmiles@gmail.com

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ABSTRACT

How do people in a precarious profession leverage technology to grow their business and improve their quality of life? Sex workers sit at the intersection of multiple marginalized identities and make up a sizeable workforce: the UN estimates that at least 42 million sex workers are conducting business across the globe. Yet, little research has examined how well technology fulfills sex workers' business needs in the face of unique social, political, legal, and safety constraints.

We present interviews with 29 sex workers in Germany and Switzerland where such work is legal, offering a first HCI perspective on this population's use of technology. While our participants demonstrate savvy navigation of online spaces, sex workers encounter frustrating barriers due to an American-dominated internet that enforces puritan values globally. Our findings raise concerns about digital discrimination against sex workers and suggest concrete directions for the design of more inclusive technology.

Keywords · ·

1 Introduction

HCI has looked at how technology has impacted many different professions and fields, for example crowd work [1, 2, 3, 4], micro-entrepreneurship [5, 6], and even hospital porters [7]. Yet, we are only beginning to explore the role of technology in sex and sexuality. Prior work has explored dating apps [8, 9], sexting [10], porn [11], and sex work support organizations [12, 13], identifying ways that HCI can contribute to supporting safe spaces.

However, there is a "paucity of empirical data" about the role of technology in the business of sex work itself [14, 15]. Sex work, like most professions, has evolved with the rise of digital technologies. While sex workers are a notoriously hard-to-measure population [16, 17], at least 42 billion people are estimated as being employed in the sex-work industry across the globe [18, 19]. Many sex workers sit at the intersection of multiple marginalized identities, leading this sizeable, digitally-facilitated workforce to face significant challenges with a unique set of social, political, legal, and safety constraints. Yet, sex workers are understudied in the HCI literature: no existing work, to our knowledge, examines technology-enabled sex work as a business directly and empirically through interviews with sex workers themselves.

In this paper, we fill this gap in the HCI literature and bring light to this hidden, yet sizable, portion of the modern workforce. We investigate how sex workers in Germany and Switzerland, two countries where sex work is legal, use technology through 29 semi-structured, in-depth interviews with this hard-to-study population [16] and examine gaps in the technological landscape through an HCI lens. Our findings offer insight into how the Internet is used for sex work

by sex workers, how mainstream technological platforms discriminate against this group – expanding on the body of knowledge regarding sex and sexuality-based digital redlining [20], and how technologists can better support inclusive and non-discriminatory online spaces for this sizeable, marginalized segment of the global workforce.

Specifically, from our interviews, we explore the four ways in which sex workers use technology for business development: to solicit, vet, and maintain relationships with clients as well as to receive payments. We highlight two critical challenges in the landscape of technology for sex workers. First, the encoding of American moral values in mainstream technology platforms results in discrimination and harms against legal sex workers based on work identity. Second, a lack of engagement of sex workers in the design process for sex work business technologies results in, platforms lacking key functionality and imposing gendered-stereotype-based affordances (e.g., assuming all clients are cis men, and all workers cis women, where "cis" means their gender identity aligns with the one they were assigned at birth). Our results offer concrete insights on design guidelines for technologists who seek to empower and partner with the sex-work community, complementing and expanding on existing work on designing for marginalized groups (e.g., [21, 22, 23, 24]).

2 Background & Related Work

Sex work is broadly defined as the exchange of sexual services for money. Sex work can include services ranging from escorting, porn acting, phone sex or camming (e.g., erotic exchange on audio or video), to erotic massage, dancing, and professional domination, among many others.

The legality of sex work varies significantly across the globe, creating differing levels of risk of violence, exploitation, and arrest [25]. Many sex workers also sit at the intersection of multiple marginalized identities. For example, migrant workers make up a large portion of the sex worker population: a 2008 study found that an average of 65% of sex workers in EU-15 countries were migrant workers and thus, may be subject to additional discrimination and risk of immigration or criminal action [26]. Elsewhere, the 2015 U.S. Transgender Survey, representing over 27,000 trans people in the United States, found that 12% of respondents had done sex work for income at some point in their lives [27].

Our study is situated in Germany and Switzerland, where sex work is legal and regulated, and where workers are required to register with the government [26]. While this means, for example, that registered workers may have safer access to police in cases of assault or harassment, stigma and privacy concerns may still lead workers in those countries to avoid registration [25].

As with nearly all other professions, sex work has been impacted by the increasing ubiquity of the Internet. Borrowing the definition from Jones, we define digital sex work as "Internet-mediated exchange of sexual commodities and/or services" [15]. Digital technologies are incorporated into the workflow of sex workers in multiple ways, for example in how they advertise, or by facilitating the entire transaction over a digital platform like a cam session [14]. Sex work in the digital era creates both new opportunities as well as challenges for sex workers [15].

Multiple studies have examined how the Internet has altered the commercial sex market from an economic perspective. Cunningham and Kendall found in 2011 that although there was a rise in digital sex work, this rise was primarily an increase in the overall commercial sex market, rather than a migration of street-based sex workers to digital spaces [28]. They also found that digitally-mediated sex work saw higher wages than outdoor work, though this was less true for those who had previously been outdoor workers [28]. Five years later, Sanders et al. found that 35% of escorts based in the UK had also worked in digital-only spaces before escorting, such as camming [29], indicating that sex workers may have begun to move between on- and off-line markets, with many doing digital-only sex work at some point in their careers. In subsequent work, Sanders et al. used interviews and surveys with UK-based sex workers to map out the ecosystem of online sex work, identifying the types of platforms leveraged by workers and the business models of those platforms [30] with the ultimate goal of identifying challenges in the regulation of the sex industry in the UK. Our work builds on this existing, economics-focused work, going beyond an examination of business models to take a critical HCI lens toward examining the technology ecosystem of sex work with a focus on sex workers' decisions regarding technology and the successful and unsuccessful affordances of these technologies.

Sex-work literature has also focused on how the Internet has changed the workplace for in-person sex workers. In a content analysis of 76 escort websites, Castle and Lee describe how sex workers use digital platforms to advertise, schedule sessions, screen clients, and to receive reviews from clients that support their business [31]. Relatedly, Moorman and Harrison also conduct a content analysis of escort advertisements on Backpage, examining how sex workers handle risk in their phrasing of advertisements [32]. We build on this prior content-analysis-based work by directly interviewing sex workers regarding their uses of technology. Yet other prior work addresses how digital-only workers such as porn workers or camming workers use technology, and how the community standards of technology companies impede their work [14, 33].

Within the space of HCI, Strohmayer et al. studied social justice services provided by sex worker rights organizations [13]. In particular, they looked at the formation and affordances of the *Bad Client and Aggressor List*, which is used by sex workers in Quebec to exchange information about bad and potentially dangerous clients. Building on this analysis, they recommend several design considerations for technologies supporting social justice within the sex industry, including the importance of designing for different segments of a community, such as those who may be facing "stigmatization, marginalization, or criminalization." Our work expands on this prior work, interviewing a broader group of sex workers and taking a wider lens toward understanding how sex workers use technology outside of this specific application in the social justice space. In 2011, Sambasivan et al. conducted ethnographic inquiries with outdoor urban sex workers in India, in order to design a phone-based broadcasting system for reaching out to sex workers [34]. Their work focuses primarily on the broadcasting system, and the sex workers in their study were primarily working outdoors without digital mediation.

To our knowledge, these two studies are the only HCI publications about technology and sex work specifically. Additional prior work has examined sex and sexuality within HCI, and there have been increasing calls to explore the space further [35, 36]. For example, recent work has considered how people experience pleasure [37], sext safely [10], and (though once described as the "elephant in the room" in HCI [38, 35]) interact with porn [11, 39]. Yet other work has explored the digital dating experiences of communities marginalized due to their sexual identity [8, 9].

As noted earlier, sex workers make up a sizeable workforce [18, 19] and yet there is a severe lack of empirical data from direct study regarding how technology mediates the *business* of sex work [14, 15]. Our work addresses this gap. We build upon this existing literature as the first HCI work, to our knowledge, to study directly through conversations with workers themselves how technology digitally-mediates the businesses of full-service, in-person sex workers in countries where sex work is legal.

3 Methods

In order to understand how sex workers use technology we conducted 29 semi-structured interviews in late 2018 with sex workers in Germany and Switzerland where such work is legal. In this section, we describe our interview protocol, recruitment methodology, analysis process, as well as the ethics and limitations of our work.[1]

3.1 Recruitment

Sex workers are a notoriously difficult-to-reach population for research [17]. Thus, we spent over four months gaining trust and recruiting our participants. We used three different approaches to recruit: a) direct contact; b) contact through sex work organizations; and c) participant-driven (snowball) sampling. As discussed extensively in the literature, participant-driven sampling is among the best ways to sample a marginalized population, and to sample sex workers specifically [41, 42, 43]. However, participant-driven sampling also has generalizability limitations as it may lead to very related participant pools. To address this limitation, we used a variety of recruitment approaches, and less than 10% of our participants were referred through participant-driven sampling (as far as we are aware).

We contacted workers directly both in person and online. For in-person recruitment we visited multiple cities, multiple times, and left flyers on outdoor tables near brothels and on cigarette machines inside brothels. Both German and English flyers were distributed (see [40] for flyer examples), and the flyers were reviewed by a sex worker who was hired as a consultant before distribution. We also compiled a list of all of the brothels in three cities in Switzerland and three cities in Germany and emailed or called every brothel to provide them with our recruitment materials.

We also recruited through sex work organizations in both Germany and in Switzerland. In the case of one organization, an officer in the organization participated in the study both as a consenting participant and as a way to check out the study to make sure that it was safe and appropriate. Being satisfied with it, she distributed the recruitment information to the rest of the organization's membership.

Finally, we also offered an additional 10 Euro/CHF payment for referrals of new participants from those who had already participated in order to facilitate participant-driven sampling.

Participants signed up for the study via an online web form, which collected no personal information for participant protection (see Section 3.5). Participants were required to provide an email address so that they could be contacted for scheduling and sent their payments, but were provided with instructions on how to create an anonymous ProtonMail account that they could use if desired.

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[1]Please see [40] for more detail regarding our methodology.

3.2 Data Collection

The interviews lasted approximately one hour, with the shortest running 30 minutes and the longest running two hours. Interviews were conducted by one of three researchers in either English or German, depending on the participants' preference. Interviews were conducted by a researcher fluent in the participants' language. Participants got to choose from one of three interview modes: chat, voice, or video. Given this multi-modal approach to data collection to accommodate respondents' preferences, some of the quotes included here are transcribed audio and others are from chat (and may have emojis and other chat-speak). For participant safety (see Section 3.5 below for more details), all interviews were conducted using private paid "rooms" on Appear.in, an end-to-end encrypted communication service. Interviewees were paid the equivalent of $75USD (75CHF or 60 Euros) for their participation in these interviews in the form of an Amazon gift card or money transfer.

3.3 Interview Protocol

To develop the protocol and become familiar with sex workers' typical language and also typical technology uses, our research team conducted an informal, inductive-coding-based analysis of four different publicly-accessible online sex worker forums. This forum analysis, which was not intended as a research artifact but rather used to help us develop the most effective interview protocol, is described in more depth in [40].

In the interviews, we first asked participants about how long they had been in the sex work industry and (broadly) what type of sex work they did. Next, we asked about non-work-related technology use: how long participants had been using the Internet, what they usually did online, etc. Following this, we asked about technology use specifically for work. We drew on the knowledge gained from our informal forum analysis to develop prompts regarding work-related technology use: specifically prompting (if unmentioned) about technology use related to advertising, client management, and payment processing. The rest of the interviews also covered additional sex-work-related topics, outside the scope of this research paper. The interview questions used in this analysis are included in the Appendix.

After we had a full draft of the interview protocol, we hired a sex worker as a consultant to review our protocol for appropriateness (both ethically and in terms of language).

3.4 Analysis

We recorded all audio interviews and copied all chat transcripts. Audio interviews were first transcribed in native language, and then all interviews (both chat and audio) were translated into English for analysis. One member of the research team was bi-lingual and consulted the original German transcripts during coding, as needed.

We used an open-coding process to analyze the interviews. In the preliminary analysis stage, three co-authors independently read four transcripts to establish a thematic framework of the interview data. The themes were organized into an initial codebook, after which two researchers independently coded and met to revise the codebook. The researchers reached a stable codebook after 10 interviews. The initial 10 interviews were re-coded along with the rest of the interviews. All interviews were double coded by two researchers who met to discuss the themes and codes after each set of two to three interviews. Because the interviewers reviewed every independently-coded transcript together, we do not present inter-rater reliability [44, 45].

We report our results in two sections, the first about the affordances of the technologies our participants leverage for their sex work (Section 4) and the second about the gaps participants identify in those technologies (Section 5).

3.5 Ethical Considerations

Even where sex work is legal, sex workers are a highly marginalized population. Thus, we took extra care to be respectful of our participants at every step in the research process. First, in addition to ethics board review, we hired a sex worker as a consultant to review our materials and approach for appropriateness. Second, we used end-to-end encrypted tools for interacting with participants, offered instructions on how participants could create anonymous email addresses to use for payment and scheduling, and used secure mechanisms for storing research data. Third, we collected no personal information about participants, including not collecting gender, age, name, location, and any other identifiable information, although some participants revealed their gender, age, or country of residence or origin during the interviews. (Accordingly, we do not report participant demographics in this paper.) Fourth, we do not report specific platform names in this paper to avoid further limiting the already small space of technologies available for legal sex workers to do their work — with the exception of platforms that already actively discriminate against sex workers, which we name in order to describe the impact on our participants.

3.6 Limitations

As with all qualitative work, our results are limited in their generalizability. While we did our best to recruit a diverse population of sex workers in European countries where such work is legal by recruiting in two different countries and at least six different cities, conducting interviews in multiple languages, and using three different recruitment mechanisms, we cannot be sure that we exhaustively captured technology use among sex workers who are working in places that sex work is legal.

The vast majority of our participants conduct in-person sex work (e.g., escorting and erotic massage), although digital sex work is far broader, including fully online work (e.g., camming, porn acting). While some of our participants also conducted digital-only sex work, our results are most representative of how technology is used to facilitate in-person work. We conducted our interviews before the COVID-19 pandemic, which has driven many sex workers to depend exclusively on online-only work for the first time [46]. Despite this, our work serves as a useful step toward illuminating the benefits and failures of technology in sex work for an HCI audience.

4 Affordances of Technology for Sex Work

The growth of the Internet has expanded the visibility of sex work online and has increased the spaces available for sex work. Our interview data show that sex workers use the Internet to conduct business with clients in four primary ways: to recruit clients (e.g., to advertise), to collect payment, to screen clients for quality and safety purposes, as well as to maintain contact with clients. *"Without the Internet, I would never [have] been able to work at home alone at my own expense, but would have been dependent on hotels, studios, and saunas..."* (P20)[2].

Depending on the type of sex work performed and a sex worker's skill and confidence with technology, their use of the Internet varies. An independent worker [3] is likely to use ad websites, their own website, and/or social media platforms to interact with their clients. Those who work for a studio, brothel, or massage parlor conduct most of their interaction through the studio website, although other technology may be used to communicate with regular clients based on the comfort and preference of the worker.

In this section we describe in detail each of the four ways sex workers use technology to build their businesses, how the sex workers we interviewed made decisions regarding what technologies to use for these purposes, and the gaps our participants identified in the existing landscape of technology available for the business of sex work.

4.1 Advertising

Our participants reported advertising through a multitude of online platforms in order to recruit clients. These platforms range from websites built for commercial sex work to popular social media platforms and messaging applications.

Our participants relied on five main heuristics to determine which platform to use for advertising: cost, convenience, safety, recommendations from colleagues, and the popularity of the platform among clients.

Cost. When asked why they used a certain platform, one participant stated, *"because it's free."* Another said because the site was *"free for women."* Many others shared this sentiment that cost was a priority in deciding whether or not to join an advertising platform.

While workers we interviewed were more likely to use free or low-cost platforms, there were reasons our participants would make exceptions. If a particular platform offered features that were important to them for a fee, they might feel that the cost was worth it. One worker said, *"websites where you have to pay to be at the top of the page...[s]ometimes that makes sense to do, sometimes it doesn't. When the websites are very, very popular, then it makes sense."* (P4)

Usability. For many workers we interviewed, the ease of finding a platform, as well as the platform being easy to use were the key - or even sole - factors used for platform selection.

> *"Well, a website must be built so that even I can understand it.... If I'm already having problems during the registration, then I usually lose interest in trying to deal with it any further."* (P19)

> *"And yeah, just really well constructed...they're [sites] made so that one can comfortably work with them."* (P5)

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[2]We include anonymized participant identifiers to indicate that unique participants are being quoted.
[3]Someone who does not work out of a studio, brothel or massage parlor.

"Regarding [why I] only use [popular platform] ...to be honest, I'm lazy. My studies keep me up at night and I don't want to spend too much time on advertising." (P11)

Safety. Many of our participants also evaluated platforms based on how safe they would feel using the platform. This might be related to whether the platform collects personal information about the account holder, like location or legal name. For example, one participant chose not to use a platform because of the information they require:

"I now no longer use [a popular payment platform], unfortunately you have to put your full real name and it can't be private. I hope soon in Switzerland it will be possible to use other apps." (P17)

In contrast, the same participant chose to use a different advertising platform because the site offered features that helped protect the worker's private information: *"some sites have their own chat [platforms] so I don't need to share my contact"*.

Several participants elaborated that their concern with sharing information with platforms was that the information would be exposed to clients or somehow end up connected to their "civilian" social media: *"I fear that there could be a trail back to me, because I also have a private profile there"*. (P23)

While some participants exclusively used platforms that allowed them to use only their manufactured identities [14] (e.g., performance names and pictures), other participants were comfortable sharing personally identifying information with certain platforms, but not others. When asked about why they do not want to share personal information with certain platforms, one participant said they decide which platforms are safe to share information with based on a *"gut feeling"*. Others shared this sentiment: *"I can't explain it exactly. When one strikes me as strange"* (P19). This echoes a common strategy our participants used to evaluate potential clients as well (see Section 4.3 for more detail).

Community Recommendations. Recommendations from other sex workers were another heuristic participants used to chose an advertising platform. Many participants mentioned learning about a platform from interactions on chat forums with other workers. If an application is viewed favorably by the community then it is more likely to be used.

"...my first criterion is its [use by] colleagues." (P23)

"[When] I heard people are using [popular mainstream platform]... [that] there are also sex workers on there who actually use it to market their services...then I started doing that, too." (P18)

Platform Popularity. Relatedly, platforms that are popular among clients are more likely to be used. Being able to reach a lot of clients was very important. Some workers we interviewed mentioned using popular platforms, even though they were poorly designed or looked of poor quality.

"I'll use a pretty cheap looking site like [popular platform] if I know that it is very well known or [that] it has a broad reach and is used frequently..." (P16)

Sometimes the decision to use a platform was location-based. Depending on the city or country the participant was working in, they might decide to join a platform that's commonly used there. In the end, the final decision is based on each individual worker, the type of work they do and whichever platform they are most comfortable using.

4.2 Payment Processing

Technology has also impacted how sex workers collect payment from clients. Although many of the sex workers we interviewed use popular mainstream platforms to advertise their services and/or communicate with their clients, they are not able to use mainstream payment platforms. The vast majority rely solely on cash or electronic gift cards as payment for their services, because their accounts on mainstream electronic payment platforms have been blocked or deleted. Since many of these payment sites operate out of the US but within a US legal framework that classifies sex work as illegal, receiving payment for such work compromises sex workers despite their occupation being legal in their country of work.

"[M]ost existing systems [payment processors] ban sex workers." (P6)

"I feel like a lot of people that I see have gone from payment processor to payment processor as they've gotten shut down over and over again. Because they're all based in the [U.S.] ... None of them will legally allow sex workers to use [...] services, they can't." (P16)

Sometimes these platforms even go so far as to *"shut down [an] account and take all [the] money [in the account]"* as well as blocking the user for life. So, even if a sex worker stopped performing sex work, they may no longer be able to use mainstream payment platforms even for non-sex-work purposes.

> *"PayPal would be great, but sex work is forbidden there and I have colleagues who did that and they got blocked for life by PayPal..." (P21)*

> *"I don't use PayPal anyways, since at one point my account was frozen with 800 Euros on it." (P4)*

Although our participants faced challenges with mainstream payment sites, none of the sex workers we spoke to used Bitcoin or other cryptocurrency. As explained by one participant, *"I'm not enough of a techie for that"*. (P3)

4.3 Vetting

Many of the sex workers we spoke to seek to "vet" – verify the safety of – potential new clients before meeting them [28, 31]. This could be done by searching a name, photo, or phone number on the Internet, or by checking with colleagues to see if anyone else has had experiences with the potential client. Workers use vetting to decide whether a client is safe to see and to ensure that the client will not waste their time by not showing at an appointment.

Workers use three types of strategies to vet clients. They may leverage tools provided by sex-worker-focused advertising sites. They may ask other sex workers or search online sex work forums to get testimonies on clients or to ask directly about certain clients whose information (e.g., name, ID, etc.) they have collected and/or to warn other workers of potentially harmful clients. Finally, they may search clients online using the information they collect about them, a strategy that has also been found in online dating [47].

> *"Occasionally, I use the internal forum from [popular ad site] in order to research client profiles, like to see if someone is warning us off or about fake profiles, etc." (P23)*

> *"I do use a specific amount of screening and word-of-mouth references and whatnot from other workers." (P16)*

> *"On [one popular platform], both clients and escorts can be rated, which can be a valuable source of information." (P11)*

> *"There's a [popular social media site] group, it's a bit private. Lots of sex workers in Berlin use it [to screen clients]." (P12)*

> *"I just check their names from a list I have. If they're [saved] in my phone already, or if any of my friends have them saved. If they seem dodgy, I might ask more people." (P18)*

While many popular advertising sites make it easy for clients to leave reviews on the profile of any worker, these sites do not make it as easy for workers to leave feedback on clients. Further, while receiving reviews from clients can help sex workers improve their reputation on the platform and enable them to book more clients, some participants reported reviews being used maliciously by clients:

> *"... for example, there's [a client forum] ... the men are in there and they write about the women. If you have really good reviews, you can [do well]...It's of course another thing, because if you annoy someone, then he'll write some sort of crap and you can't really defend yourself. There isn't a chance to fight against a bad critique.... It's very double-edged. And you can't really speak out about it, it's very hard." (P5)*

Many workers shared sentiments of wanting better vetting platforms or better affordances for vetting within existing platforms, like those offered for clients. For example, one participant discussed needing to pay for access to communities where vetting information was shared, and pointed out that for sex workers who "tour" (i.e., travel for work), the number of platforms they need to join to vet every client would be too many:

> *"Many of the vetting organizations...you have to pay them to access them. And many of the other ones are location-based, they're for specific countries, and I can't have ... like, it's not useful to me to have the UK's app on my phone when I'm not working there." (P16)*

Additionally, some participants noted a lack of gender diversity in the support for vetting either through platforms or through the sex work community: *"Actually, for male escorts... it's [screening clients] a rarity, there isn't really a network for it"* (P12).

While many participants felt that it was very important to vet clients, one participant brought up that the Internet allows clients to use pseudonyms and be anonymous, thereby threatening the efficacy of the vetting process. Furthermore, in places where sex work is legal, clients may not understand or cooperate with a worker who wants to have additional information about them for safety. For example, one participant explained,

> *"I think in Germany clients wouldn't really do that stuff [provide ID], just because it's legal. They're like, 'There's no reason for me to prove anything to you. We're not doing anything weird here.' [In] Germany they're on their real number. They might write from their home address, like from their home email address." (P18)*

A minority of participants were unconcerned about vetting. Some felt that because their work was legal, they also didn't need to vet: they could turn to the police if there was a problem.

> *"But I do not collect personal information, since I am paid not only for the work but also for discretion... Apart from that, it would take too much time..... I would have no problem calling the cops." (P20)*

Yet others were unconcerned due to their gender and/or the nature of sex work they do, while some found the vettiing process too tedious to pursue.

> *"[Vetting's] more relevant for women than men though...But I think that there are fewer problems there. I think that's because of this like, fighting ability, and also the relationship between men and women has historically been characterized by violence." (P12)*

> *"I don't check the people online, that [screening] is too time-consuming." (P21)*

4.4 Client Management

Sex workers also use technology to assist in scheduling, maintaining, and keeping in touch with their clients. Among sex workers we interviewed, outside of sessions, many maintained relationships with existing, regular clients exclusively digitally. The majority of workers we interviewed established a single platform for interacting with clients. Below we discuss workers' considerations for how to maintain relationships with clients, how they establish boundaries with clients, and when they make exceptions.

Maintaining Relationships. While some sex workers we interviewed did not talk to clients outside of appointments, often because they toured around and were not regularly in the area or because they worked at a massage parlor or brothel, which mediated all their appointments, many others spent some time and energy in connecting with clients during "off" hours. This could be either paid time, where the clients send money or gift cards to chat for a set period of time, or an extra, a *"bon bon,"* to encourage the client to return for another session. One participant explained,

> *"Nowadays you have a lot of ladies and not essentially more customers than before. Because of that you have to tie the people to you somehow. This works if you sometimes get in touch or wish them a Merry Christmas and by doing that you remind them of you and stuff like that." (P21)*

This extra communication usually happens on a "work" device or account, but some of our participants reported allowing clients to contact them on personal accounts or follow them on private social media, which we discuss below.

Establishing Boundaries. Given that online, "off-hours" communication with clients can happen constantly, many sex workers we interviewed felt a need to create boundaries between their work and personal life. For example, one worker said *"I like to keep my private life private and separated from my sex work, as I mainly work in the same city where I study."* (P11) Workers may feel this separation is necessary to *"respect [their] sphere"*. A cabaret worker stated, *"I don't really like to give my [popular social media platform] to anyone I meet at work, that's too personal."* (P1) While an escort noted that the separation is *"for [my] privacy and respect for my environment...it feels weird to mix guests and private life."* (P15)

Boundaries can be established in multiple ways: by communicating rules upfront before any transactions take place, by having multiple devices (one for work and one for personal life), by maintaining multiple profiles for certain platforms, or as aforementioned, by simply limiting client interactions to certain platforms only so as to separate personal life from their sex work (e.g., not giving out social media usernames to clients). For example, one participant explained that they manage this boundary by being *"very particular in how clients have to contact me"* (P6)

Regarding communicating rules up front, one worker said, *"I have my own website, so...I have [an] FAQ page. And there I [post] questions, which they might ask....then they are all already answered."* (P22)

Many workers mentioned creating boundaries by having separate devices dedicated solely to their work.

> *"I have two phones; I have a private phone and I have an extra phone for my work...I have a second [not sex work] profession, you know... In my second job I have customer contact [also using my phone]. Before, when I was a student, it didn't matter at all. .... But now [because] I have client contact [in both jobs]... So I said, no. And I separated the phone numbers."* (P22)

> *"I feel like it's [keeping personal life separate from work life] been easier with the two different phones."* (P18)

However, some workers find creating such boundaries through multiple devices difficult to implement: *"I had another phone with a different number...but then I noticed that it was just too much work for me, separating them. And then I was also really slow to get back to them and stuff"* (P12). Instead of creating boundaries through multiple devices, some workers find it easier to create separate work and personal profiles, although many mentioned that some platforms do not allow this.

Finally, a few workers did not feel the need to create such digital boundaries, because they used the Internet only for work: *"I consider almost all my online time to be about work...even social media for me is about work... it's not a leisure thing for me."* (P8)

Making Exceptions. Sometimes participants described situations when they changed or modified a boundary for a client. This usually happened with long-time clients who had established a trusting relationship with the sex worker. Others might accommodate client needs like payment method or communication platform if their phone number was not reliable. More commonly, a client crossing a boundary, for example by finding one of our participants' personal social media accounts, would result in the client being blocked.

> *"I [exchanged] only [popular social media] with the guy, because it was a time when I changed my phone numbers...a lot, and I was about to travel again, so I said [popular social media] is more convenient, because I won't change that one for sure...with that guy it was no problem, because he was a regular coming in each week/two weeks. I know him for a while and he added me after he spent [a lot of money] 3 days in a row. can't really be mad at him :DDD"* (P1)

> *"The ones [clients] that have my [private] number, that's only been two. I've also met them privately to have coffee or whatever... so it has somehow tipped over into the private zone and I would want to reflect that. But that's really an exception, because it's only been with two other people thus far where I can really say that that's now actually private and they're like friends or whatever."* (P26)

> *"With one regular [I have a personal relationship], yes. Even about some private stuff, actually. I think that has to do with me being a bit inexperienced back then. Now I sometimes regret this aspect because now it's hard to kind of take that back."* (P29)

> *"We discuss customer wishes via [e]mail or if someone is severely disabled via telephone, as an exception"* (P15)

5 Gaps in Existing Technology for Sex Work

The sex workers we interviewed used technology for a myriad of business purposes. However, there were notable gaps they described in the technologies available for use. First, the workers described that most platforms were not built for sex work. The encoding of "moral values" – specifically American puritan and anti-sex work values – exclude legal sex

workers from equal access to many technologies for both work and non-work purposes. Second, workers described a lack of sex-worker involvement and a lack of diversity in the development of even sex-worker-focused websites, which led these technologies to lack necessary functionality.

5.1 Not built for sex work: how the "morality" of an American-dominated internet excludes legal sex workers

While the Internet has expanded the visibility of sex workers online and offers many benefits for sex workers [14, 15], many online platforms actively discriminate against sex workers.

Many sex workers we interviewed described having their accounts frozen, blocked, or completely deleted without warning because they were suspected of being a sex worker, even though many are doing their work legally.

> *"I feel like a lot of people that I see have gone from payment processor to payment processor as they've gotten shut down over and over again." (P16)*

> *"Airbnb bans workers just for being [sex workers]...they have not show[n] their face, don't use the same email or phone, and [aren't using the platform for work]." (P13)*

This issue is not limited to payment platforms. Many workers mentioned having accounts deleted by other platforms without warning.

> *"PayPal and Instagram are not friends of sex workers...I had, I don't know how many followers on Instagram and at some point, I hadn't even posted [nudes] or something, at some point it was just deleted...So that definitely hurt my business, but not in a way that I bled to death or something. But that was pretty shitty." (P4)*

> *"As someone who offers proactive erotic services, you are clearly at a disadvantage in the American-dominated Internet. There is censorship (content that must not be present, page blocks, photos that must not be shown etc.) and restrictions..." (P20)*

In many cases, this censorship took place regardless of whether the participant was using the platform for sex work. Workers found themselves being blocked on platforms and accounts that they have never used for sex work, and on accounts that they had taken pains to keep separate from their sex work profiles. This shows that not only are sex workers blocked from working on certain platforms, but they are discriminated against based only on their profession. For example, three participants shared how AirBnB is particularly aggressive in blocking sex workers from the platform, regardless of how they use it:

> *"I will also have a third fucking phone for AirBnB cause AirBnB bans workers just for being sw [sex workers] they have not show their face, dont use the same email or phone...they don't work from AirBnB and they got banned." (P13)*

Some sex workers also mentioned the restrictions placed on them due to laws in other countries, such as FOSTA-SESTA in the U.S. and the subsequent takedown of Backpage, a classified advertising website that had been a valuable and safe place for many workers to advertise.

> *"I mean when Backpage closed down, that was pretty traumatizing, to be honest. That sucked. There's a lot of hate from people who want to make sex working even more illegal and just write really wild stuff that makes me feel unsafe." (P18)*

This imposition of American laws and values into international markets is consistent with the findings of Sanders et al., who report that location-based dating and hookup apps often lack a space for advertising commercial sex because major app stores like Google Play and Apple prohibit commercial sex applications [30].

5.2 Parasitic Sex-Worker-Focused Platforms

Sex-worker-focused platforms can also cause significant harm to workers. Many sex workers shared stories about platforms stealing their photos and using them on newly created advertising sites, without their consent and/or using their photos to advertise services that the workers did not offer. Some platforms do this as a way to build up their client

base and coerce workers into utilizing their services. Others use workers' photos to run scams on potential clients. This not only violates copyright, it violates worker privacy, as many of these platforms tend to include workers' personally identifiable information along with their photos.

> *"[T]here is a stupid practice of Internet advertising platforms. Right at the beginning, they simply took the personal ads out of the papers and put them on the Internet...yeah without asking. Clients have told me that they would have gotten my number off the Internet and I thought at first, 'no way'. I looked into it and they [operator of the platform] told me I should be happy that I would get more advertising." (P14)*

> *"There's this website...[that] would make ads for you. It finds your website, takes your stuff, likes your copy and your photos, and just makes an ad. [T]hey would put it online sort of, and then they would email you and be like, Look, we made you this ad. We're a new popular platform. Do you want to publish it?" And that still felt like an invasion of privacy, because they had actually gone in and read my stuff without intending to book and compiled this weird ad that wasn't really how I would make my ad, you know? But then it was like, Oh, I'll just try it. It's still there already." And that's how they started building up their client base, and within a few years it was super popular, and ads would cost $15 to push to the top of a page going from zero." (P18)*

For some, the only way to get these photos taken down is through a legal takedown request, which is expensive, time-consuming, and not always successful.

> *"Legally, that would have been too laborious for me." (P14)*

> *"I haven't been able to get mine down. I haven't tried very hard, but I know a lot of people have, and they don't take them down. And that's the thing with being criminalized, it's like where do we even turn? No one cares about people stealing your stuff. And even if someone cared, we would probably have to give our real names or something. If someone was gonna take someone to court, or you know ... It's complicated." (P18)*

5.3 Lack of Sex Worker Involvement & Diversity Consideration in Sex-Worker-Focused Technology

Finally, even sex-worker-focused platforms that are not actively exploiting workers often encode exclusionary and stereotype-driven designs that limit the utility of technology for workers. Even in sex-work-focused technologies, sex workers were rarely involved in the platform design. Thus, many sex worker needs go unaddressed, increasing the need for multiple platforms to advertise, vet, and manage clients.

> *"Honestly, I would say one of my biggest pet peeves is that almost all of the platforms that sex workers use as far as advertising and for keeping ourselves safe...none of these are run by sex workers. Many of them are run by older white dudes who are profiting off of the workers. And that I find problematic in many ways." (P16)*

This lack of user-driven design results in a lack of accommodation of the diverse range of sex workers. Multiple participants noted that many of sex-worker-focused platforms are not gender inclusive and thus lack key functionality.

> *"I would be interested in having more platforms that are actually queer. Where women and men can offer different services." (P12)*

> *"I would like for [sex work] to be more diverse in terms of how it is branded for gender...like, more sites that are for women looking for women or queers looking for queer sex workers... a lot of apps and sites are heteronormative. Even if they accept trans people, that is not the general branding." (P8)*

> *"it's not trans friendly...it's like you choose "man=customer and woman=seller." (P13)*

> *"I'm transmasculine, so most of the clients and most of the resources are set up specifically for ciswomen. Many of the advertising platforms don't allow me to advertise at all." (P16)*

Gender inclusivity is also a problem in general social media platforms. For example, although this was a critique not related to sex work, Facebook's "real-name policy" was cited several times as a policy that harmed people by requiring

unnecessary information based on the company's assumptions about who their users are and how they want to use the platform.

> *"Many, many, many trans people cannot legally access name change resources. Forcing all of us to use a platform that makes us use whatever legal name we were given when we were children is really harmful." (P16)*

One worker mentioned how such issues could be solved by design teams including sex workers as consultants or team members, and described how they have already seen evidence of how this improves platforms.

> *"the [platforms] that have sex workers involved with them, often are more inclusive. They generally have more gender diversity just in the option to advertise or to interact. Generally, they are more welcoming spaces. It's super common for many of the ad platforms." (P16)*

6 Discussion

In this section we offer (1) concrete suggestions for technologists to design more inclusive online spaces for sex workers. Relatedly, we (2) draw on our findings to highlight the need to de-Americanize technology and create a more open online ecosystem for sex workers.

6.1 Designing for sex work

Although we conducted our study in countries where sex work is legal, our participants faced barriers in successfully using the internet for work, often resulting from international differences in legality and the stigmatized nature of sex work.

Many of our participants struggled with finding a digital payment option that was both reliable and discrete. PayPal could confiscate their earnings at any moment and would do so if they were identified as a sex worker, legal or not. Bank transfers may be seen as undesirable by clients who do not want the transaction to be visible to a spouse.

Similarly, our participants reported that many advertising platforms seemed to be designed without sex-worker input or involvement, resulting in insufficient, heteronormative tools for queer and trans workers. This demonstrates the need for applications that provide high-quality business services without discriminating against or stereotyping sex workers.

These gaps need to be filled carefully. First and foremost, any platform specifically designed for sex work should involve sex workers in all steps of the design process. This is especially important to ensure platforms support gender diversity. For those platforms that aim to support fetish communities, platforms should specifically involve workers from the sector the platform serves.

A critical guideline is to maintain respect during the design process: Respect of different identities, different client models, and respect that there are two stakeholders in a sex work transaction – clients and workers. As one worker put it, "[I want technology] that considers me a person and not a product. But that's really asking for a lot from the anonymous virtual world." One specific example is the lack of respect for workers' intersectional identities and resulting needs for technology affordances that accommodate those identities. Many participants complained about sex-work-focused platforms' heteronormative assumption about workers being cis women and clients being cis men. This assumption made by platforms is demonstrably false: according to some surveys more than a quarter of sex workers are not conducting heteronormative work [30].

While the commercial sex sector is ripe for innovation, new technologies must be approached critically. Platforms and tools that operate in novel or unintuitive ways may not always succeed. In order to be useful, both sex workers and clients need to be aware of and comfortable using the platform. Cryptocurrency is one cautionary tale: although cryptocurrencies are frequently promoted as anonymous and censorship-resistant [48, 49, 50], none of the sex workers we spoke to had used Bitcoin or another cryptocurrency. The few participants who explained why that was the case either felt that the technology was too complex for them to manage or too difficult for their clients, many of whom are older and less tech-savvy. A truly innovative and effective approach would empower sex workers to develop their own platforms, for example, through technical outreach to sex-work communities with the aim of providing the tools for sex workers individually or collectively to build the platforms they need. Sex-worker-led initiatives have already led to successful platforms with relatively sizeable user bases, as has been demonstrated by the sex worker and technologist collective Assembly Four [51], who created Tryst [52], an advertising platform, and Switter, a sex work social media space [53].

Sex workers come from different social classes and educational backgrounds [30]. In our study, three participants shared during the course of the interview that they had studied technology or were involved in technology communities. Thus, the dearth of sex-worker-developed technologies cannot be blamed on a lack of relevant expertise in the community, rather, it awaits the willingness of technology providers to incorporate sex workers' perspectives into their product development. Such inclusion efforts must carefully consider best practices for engaging communities that may otherwise be excluded from "hackathons" and similar activities, while respecting that the workers bring a diverse set of knowledge and the best understanding of their work. Guides such as the Practice Guidance from the Beyond the Gaze project in the UK offer useful tools for engaging with digital sex workers [54].

6.2 De-Americanization & Opening Tech

Outside of the need for change in sex-worker-focused platforms, our participants also reported significant barriers due to what one participant called the "American-dominated Internet". Many large platforms like PayPal, AirBnB, and others are owned and operated in the United States, whose laws and norms get exported to international markets. Thus, even sex workers who attempt to use mainstream technologies to do perfectly legal activities according to their country of residence find themselves facing surprising repercussions. While sex workers have long been subjected to restrictive community standards from social media sites, this discrimination has gotten worse since the passing of FOSTA, an American law aimed at preventing sex trafficking by removing legal protections for Internet companies hosting content about commercial sex [55]. This law's conflation of sex trafficking with consensual sex work has led to over-enforcement in the United States for fear of legal repercussions, and has led to global consequences for sex workers [56].

Furthermore, American companies are not only preventing legal sex work from taking place on their platforms, but are discriminating against sex workers due only to their *identity as a sex worker*. They do this even if these workers never use the platform for work purposes. The implications of this are ominous. First, technology platforms are exercising full authority to decide which identities to allow or ban from their platforms as illustrated by the ongoing debates over "real name" policies. These policies affect multiple marginalized communities [57], including sex workers as evidenced by our data, raising significant concerns about which identities are now or may one day be banned at the whims of technology companies. Second, our participants did not always know why they or their friends had been banned, making management of their online identities difficult, violating, and stressful, as it was sometimes impossible for them to discover how they were identified as a sex worker. Third, recourse against technology platforms' decisions is difficult, if not impossible [58]. This means that a sex worker who stopped working may face consequences indefinitely, or a person incorrectly identified as a sex worker may struggle to regain access to an account. Our findings echo similar calls for investigating and disrupting implicit assumptions about users' behavior and needs, and in particular support calls for decolonizing tech [59] and critiques of data universalism [60].

7 Conclusion

In this paper, we interviewed 29 sex workers, whose online identities in many cases intersect with multiple marginalized communities. We called attention to the four main ways sex workers are using technology to conduct business. We also highlighted the digital marginalization of sex workers due to both the encoding of American, puritan values in technology platforms, and the lack of inclusion of sex workers in the design of sex-worker-focused technologies. Our work underscores the general lack of inclusivity (gender-based and sexuality-based) in the design of sex-worker technologies and the restrictions placed on workers due to the dominance of American-based technology companies. We offered concrete approaches for technologists to adopt when designing more inclusive technologies.

Sex work is still heavily stigmatized, even in countries where it is legal. As such, sex workers are often excluded from legal, health, and social services, and as shown in this paper, from technological services. Because so many view sex workers as objects whose sole identity is just that of selling sex, many workers are judged on this one aspect of their identities. This is evidenced by the discrimination and harassment faced by workers online, both while trying to use the internet recreationally and for work. Our research contributes to the ongoing conversation regarding censorship of marginalized communities in online spaces.

This project focused on sex workers in countries where sex work is legal; the needs and implications for many who work in jurisdictions where sex work is not legal are complex and even more understudied. As such, we encourage future work investigating the technology uses and needs of sex workers working under illegal conditions.

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Appendix

Interview Questions

Here, we include the relevant interview questions from our larger interview protocol.

- Could you tell me a little bit about what you do for work currently?
  - *[prompt if they did not describe sex work]* Could you tell me more about the sex work that you do?
  - How long would you say you've been doing this?
- When did you first start using the Internet or a mobile phone?
- What do you usually do online during your free time (when you're not working)?
  - Do you use social media at all (facebook, Instagram, twitter, pinterest, snapchat, whisper)
  - Do you post or mostly just read things other people post?
  - *[prompt if needed]* do you seek out information online like searching for entertainment or news?
- Do you use the Internet or your mobile at all for your sex work? Like, to stay in touch with regulars, to screen clients, to advertise, or to get paid?
  - *[prompt if relevant]* How did you learn to do this?
  - *[prompt if relevant]* Did you run into any challenges?
  - *[for advertising and payment sites]*: Does it matter whether the site requests personal information?
- Where are you connected with your clients? Email, SMS, Whatsapp, Signal, Twitter, Switter, Facebook, etc.
  - How did you decide to stay in touch using these services?
  - Are there any places you don't want to connect with clients?
  - Are there any ways in which you restrict your communications?
- Have you ever adapted your practices to what a client wanted to use?
- Are there other ways that we have not talked about in which you use the internet for your work?
- What are aspects of your work that current tools and services cannot help with even though you wish they could? Are there any online tools you wished existed for you to use in your work? What would those look like, what would they do?
  - *[prompt]* What problem would this solve?
- Some people try to maintain distance between their personal and work life, others don't. Do you try to separate your work and personal content online? Or in general? or do you feel like it's all one and the same? If separate, what exactly does this entail? Separate profiles? Separate devices?
  - Would you say that you try to "be a certain person" or maintain a particular "image" when using the internet for your [work/personal]?
  - Why did you decide to keep things separate?
  - Were there any challenges?
  - Are there any particular tools or settings that you use?
  - Would you be upset if there was overlap or if a client found your personal content?
  - Has this worked or have you had any cases where things did not work out as you would have liked?
  - If not separate, why not?
- How do clients pay you?
  - How did you decide what payment method to use?
  - Have you always used this payment method?
  - Did you have any challenges when selecting a payment method?
  - *[if not mentioned]* is how much information is revealed to your client or the payment provider a concern?
  - *[if not mentioned]* Have you ever heard of bitcoin? If yes, have you considered using bitcoin?
- Have you ever had anything you would consider a negative experience online?
  - *[prompts]* Had a client find out something about you that you didn't want them to know? For example, finding real names or phone numbers? Threatening text? Blackmail? (Doxxing)
  - Were you interested in trying to prevent this in the future?

- Were any specific measures available for you to try to prevent this? How/why/where did you learn this?
- Do you think that working in the sex industry has changed how you behave online?
  - How about in the offline world?
  - How do you feel about this change?
- If you were to give new people doing your type of sex work advice about using the Internet for their work, what would you tell them?