

“Disadvantaged in the American-dominated Internet”: Sex, Work, and Technology

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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 United Nations 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.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**;
• **Social and professional topics** → **Gender**; **Computing / technology policy**; • **Information systems** → **Computing platforms**; **Collaborative and social computing systems and tools**.

KEYWORDS

sex, sex work, technology, work, qualitative, interview, marginalized population, digital workplace, harassment, discrimination

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1 INTRODUCTION

Human computer interaction (HCI) literature has examined how technology has impacted many different professions and fields, for example crowd work [2, 11, 34, 35], micro-entrepreneurship [27, 51], and even hospital porters [10]. Yet, we are only beginning to explore the role of technology in sex and sexuality. Prior work has explored dating apps [8, 15], sexting [18], porn [47], and sex-work support organizations [64, 65], 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 [30, 31]. Sex work, like most professions, has evolved with the rise of digital technologies. While sex workers are a notoriously hard-to-measure population [20, 60], at least 42 million people are estimated as being employed in the sex-work industry across the globe [38, 71]. This sizeable, digitally-facilitated workforce faces significant challenges with a unique set of social, political, legal, and safety constraints, which may be exacerbated by the fact that many sex workers sit at the intersection of multiple marginalized identities. Yet, sex workers are understudied in the HCI literature: no existing work in the field, 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 share insights from 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 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 [50] — 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 harm 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 cisgender men, and all workers cisgender women, where “cisgender” 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., [17, 23, 58, 72]).

2 BACKGROUND & RELATED WORK

Here we discuss existing literature on sex work and how sex work has evolved with the internet.

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 [52]. Criminalization of sex work has been shown to increase the rate of violence from clients, increase health risks (e.g., HIV), and put workers at risk of arrest and police violence [53]. Furthermore, criminalization hinders access to justice in cases of assault or harassment and has been shown to disrupt peer support networks and risk-limiting opportunities.

We conducted our study in Germany and Switzerland, where sex work is legal and regulated, and where workers are required to register with the government [67]. While this means, for example, that registered workers may have safer access to police, social stigma [22] and privacy concerns may still lead workers in those countries to avoid registration [52].

For a sizeable number of sex workers, the highly stigmatized nature of their work [22] may be only one of multiple sources of digital risk they manage. Many sex workers also sit at the intersection of multiple marginalized identities, impacting both how they manage safety online as well as self-presentation.

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 European countries were migrant workers [67]. This means many workers in Germany and Switzerland may not be eligible for registration and may be subject to additional discrimination and risk of immigration or criminal action. Furthermore, 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 [28]. Recent work by Lerner et al. on digital privacy in trans communities online has examined how the internet has provided new opportunities for representation for trans people, but has also amplified risk such as of blackmail and harassment [36].

Technology & Sex Work. 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” [30]. 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 [31]. Sex work in the digital era creates both new opportunities as well as challenges for sex workers [30].

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 [13]. 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 [13]. 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 [56], 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 [57] 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 technological 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 receive reviews from clients that support their business [12]. Relatedly, Moorman and Harrison also conducted a content analysis of escort advertisements on Backpage, examining how sex workers handle risk in their phrasing of advertisements [46]. 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 cam workers use technology, and how the community standards of technology companies impede their work [31, 62].

Within the space of HCI, Strohmayr et al. studied social justice services provided by sex-worker rights organizations [64]. 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 [55]. 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 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 [32, 33]. For example, recent work has considered how people experience pleasure [5], sext safely [18], and (though once described as the “elephant in the room” in HCI [7, 33]) interact with porn [47, 75]. Yet other work has explored the digital dating experiences of communities marginalized due to their sexual identity [8, 15].

As noted earlier, sex workers make up a sizeable workforce [38, 71] and yet there is a severe lack of empirical data from direct study regarding how technology mediates the *business* of sex work [30, 31]. 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 sex work is legal. In this section, we describe our interview protocol, recruitment methodology, and analysis process, as well as the ethics and limitations of our work.

3.1 Interview Protocol

We created a semi-structured [25] interview protocol to investigate sex workers’ use of technology for work.

In the interview, we first collected context about the participant’s experiences in the sex-work industry. We asked how long they had been in the sex-work industry and (broadly) what type of sex work they did. Next, we gathered context on their non-work-related technology use such as how long they had been using the internet and what they usually did online. Following this, we asked about how participants used technology for sex work. The rest of the interview 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.

To ensure that we were up-to-date on appropriate and region-specific terms workers preferred to use when talking about their work, our research team conducted an informal analysis of four different publicly-accessible online sex-worker forums (<https://reddit.com/r/sexworkersonly>, <https://saafe.info/main/index.php>, sex work sub-forums on the website FetLife, and <https://sexworker.at>), the latter of which is exclusively German-language. Four researchers independently reviewed six months worth of posts from each of the forums, each focusing on a different forum. The researchers created codebooks – focused on identifying common language patterns and technology uses – based on the data they reviewed in each forum. The researchers then came together to reach consensus on a final set of themes identified across these forums. Through this analysis, we identified three categories of technology use: advertising, client management, and payment processing. If a participant did not address all of these categories during the interview, we prompted them to ensure our data collection was comprehensive. This forum



Figure 1: Example of flyer used to recruit participants.

analysis was not intended as a research artifact but rather used to help us develop the most effective interview protocol.

After we drafted the interview protocol, we hired a sex worker as a consultant to review our protocol for appropriateness and to ensure a member of the community under study was involved in the research to the extent that they desired to be involved [68]. The consultant was paid market rate for their work.

3.2 Recruitment

Sex workers are a notoriously difficult-to-reach population for research [60]. Thus, we spent over four months recruiting our participants¹. We used three different approaches to recruit: a) direct contact; b) contact through sex-work organizations; and c) participant-driven (snowball) sampling.

We informed potential participants and organizations about the study via German and English flyers (see Figure 1). The sex-worker consultant who reviewed our interview protocol also reviewed our flyers for appropriateness. The flyer included a link to an online web form through which participants could sign up for the study. The sign up form 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.

We recruited participants directly in two ways. First, we 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. Second, we visited multiple cities, multiple times, and left flyers on outdoor tables near brothels and on cigarette machines inside brothels.

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.

¹For a deeper, narrative description of the nuances of our recruiting process, see [54].

We offered an additional 10 Euro/CHF payment on top of our respondent remuneration (see below) for referrals of new participants from those who had already taken part in order to facilitate participant-driven 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 [3, 29, 41]. However, participant-driven sampling also has generalizability limitations as it may lead to recruiting participants with very similar experiences. To address this limitation, we used a variety of recruitment approaches as described above. Less than 10% of our participants were referred through participant-driven sampling (as far as we are aware).

3.3 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 participant’s preference. Each interview was conducted by a researcher fluent in the participant’s language. We took great care that our interviews were consistent across languages. To that end, the English and German interviewers met after approximately every five interviews to ensure that we remained consistent in interview length and mitigated any issues or variances in the protocol that had arisen.

Participants 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. We paid interviewees the equivalent of \$75USD (75CHF or 60 Euros) for their participation in the form of an Amazon gift card or money transfer.

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 a grounded-theory open-coding process [48, 63] 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 [40, 44].

We report our results in two sections, the first regarding the affordances of the technologies our participants leverage for their

sex work (Section 4) and the second regarding 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, we took care when developing our interview protocol to (a) align our language with current sex-worker language by reading sex work forums and (b) in addition to an ethics board review, we hired a sex worker as a consultant to review our materials and approach for appropriateness. Participants were also told clearly that they could skip any question at any time. 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, or any other identifiable information, although some participants revealed their gender, age, or country of residence or origin during the interviews, and their email addresses during recruitment². 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 and in the hopes that they may reconsider their current discriminatory practices.

3.6 Participant Descriptives

While we cannot enumerate the demographics of our participants as we did not ask participants to self-identify for the ethics reasons mentioned above, many participants named identities they hold during the conversation: not all participants were white; some were immigrants from other parts of Europe, from North America, or from Africa; not all participants were women, and not all were cisgendered. Not all of our participants were working with legal authorization. Most had multiple years’ experience working, in several cases multiple decades, and we know our participants’ ages spanned several decades.

3.7 Position Statement

We recognize the importance of our position as scholars in relation to this research [6, 9, 26, 73] and thus describe our identities, their alignment with those of our participants, and how our identities may create limitations in this work. All of the researchers involved in this work identify as women. This is a limitation of the work, as we have participants who identified as other genders and whose experiences may have been better interpreted by researchers with those identities. We have differing sexual orientations, as did our participants. We also have differing nationalities (German, Hungarian, American, and Liberian), some of which overlapped with the regions in which our participants mentioned being born. We have differing races (Black and white) and ages (early 20s through mid-40s), as did our participants. Our lack of researchers of races

²We deleted all email addresses immediately after sending participants their compensation.

other than Black and white, and our lack of researchers 50 and older is a limitation of this work, as it does not mirror all of the demographic axes of our participants.

3.8 Limitations

We review the limitations of each step of our approach. First, our interview protocol may have failed to capture the full spectrum of participants’ internet uses for work. While we took multiple steps to ensure our protocol was as comprehensive as possible (forum analysis, involving multiple researchers in the protocol development, and review by the sex-worker consultant who is a member of the participant community), we still may have failed to capture some of sex workers’ internet uses.

Second, 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 captured all perspectives among sex workers who are working in places where sex work is legal.

Third, while we took great care to ensure that our data collection procedure for interviews conducted in different languages (English and German) and modes (chat, phone, video) remained consistent, it is possible that differences in these languages and modes resulted in gaps in our data collection.

Fourth, while we aimed to involve a diverse research team in the analysis of the interviews, as expressed in our position statement, our team lacked gender diversity and did not capture a full spread of races and ages. Thus, our position as researchers to this project may have limited the insights gained, particularly about participants whose identities differ from our own.

Fifth, the vast majority of our participants conduct in-person sex work (e.g., escorting and erotic massage), not digital sex work per se, which is also common, 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.

4 SEX-WORK TECHNOLOGY AFFORDANCES

The growth of the internet has expanded the visibility of sex work online and has increased the spaces available for sex work. For example, P20³ comments: *“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...”*

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, and to maintain contact with clients.

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 worker⁴ is likely to use advertising platforms, 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. Our results are summarized in Table 1.

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. Most sex workers we interviewed prefer to advertise their services on platforms that allows them to advertise for free. When asked why they used a certain platform, one participant stated, *“because it’s free.”* Another said they used a particular platform because it was *“free for women.”* On the other hand, a few participants used the cost of a platform as a heuristic for quality, preferring to use platforms that charge a fee to ensure the service is worth using.

Some participants used both free and paid platforms to advertise. Those who used a combination of platforms used paid platforms if those platforms offered features that were important to them or they paid for premium features on popular platforms to boost their business. For example, P4, a dominatrix with seven years of experience explains that sometimes they pay to appear at the top of the page because *“when the websites are very, very popular, then it makes sense [to pay for that].”*

Usability. Beyond considering cost, the ease of finding the advertising platform, as well as the usability of the platform were key - or even sole - factors used for platform selection. As P19, an escort with 25 years of experience, put it, *“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.”* Several other participants shared similar sentiments, mentioning the need for platforms to be *“well constructed”* in a manner that *“anybody could use comfortably”*.

Others were driven by the convenience of platforms that offered features that simplified and made the advertising process less stressful. For example, P11 comments, *“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.”*

Safety. Participants also evaluated platforms based on how safe they felt while using that 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.”*

³We include anonymized participant identifiers to indicate that unique participants are being quoted.

⁴Someone who does not work out of a studio, brothel, or massage parlor.

Table 1: Summary of results: How sex workers use technology in their work and the challenges they experience in doing so.

Internet Use	Mechanisms	Challenges
Advertising	<ul style="list-style-type: none"> Sex workers use sex-work-specific advertising platforms, their own personal websites, and mainstream social media platforms to advertise. They evaluate platforms with five heuristics: <ul style="list-style-type: none"> Price to use platforms (Cost) Platform features that facilitate easy use (Usability) Type of information being collected doesn't violate privacy (Safety) Platform's reputations amongst other sex workers (Community Recommendations) Platform's reach among clients (Platform Popularity) 	<ul style="list-style-type: none"> Many platforms are missing key features Lack of gender-inclusive options for trans and non-conforming workers underscores need for more sex worker involvement in design
Payments	<ul style="list-style-type: none"> Many major digital payment platforms are unreliable for sex work Many workers use cash and electronic gift cards in addition to, or instead of, electronic payment 	<ul style="list-style-type: none"> Issues with payment are a major concern for workers Workers are often banned from using payment platforms, with platforms even going so far as shutting down worker accounts, including funds left in accounts Many point to the dominance of American-based companies that impose U.S. laws on workers globally as a cause for these issues
Vetting Clients	<ul style="list-style-type: none"> Sex workers use one of three methods to vet clients: <ul style="list-style-type: none"> Researching clients online Using tools provided by sex-work-specific platforms such as client ratings Sex-worker communities, asking other sex workers (online in sex-worker forums or in-person) about a potential client 	<ul style="list-style-type: none"> Current range of tools available for workers to vet is not efficient Most workers have to use multiple platforms and strategies instead of having an all-in-one system
Client Management	<ul style="list-style-type: none"> Communication with clients mediated through multiple platforms with workers implementing rules and boundaries to protect digital identities and safety (including mental health): <ul style="list-style-type: none"> Rules include only using specific platforms to talk to clients Setting a time limit and making sure not to perform any work outside that time-frame Limiting client access to personal accounts Boundary exceptions made for long-time clients and/or for clients who paid an additional fee 	<ul style="list-style-type: none"> As some workers are not out (i.e., family and friends are not aware of workers' identity as sex workers) protecting this separation is an important part of their online work

For this participant, being required to make their personal information public was a reason to reject the platform, despite the benefit of access to a larger clientele. The same participant chose to use a different advertising platform because the platform offered privacy-focused features: *“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. For example, P23 said of why they do not create a work profile on a popular social media platform, *“I fear that there could be a trail back to me, because I also have a private profile there.”* This risk of context collapse [39], in which different intended audiences for digital content are suddenly merged, is particularly dangerous for this population, which may face blackmail and harassment if they are outed.

This sentiment was particularly strong among participants who were not out to their friends and family about their sex work. When possible, many workers use manufactured identities [31] (e.g., performance names and pictures) to register with advertising platforms. While some participants exclusively used platforms that allowed them to use only their manufactured identities, 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 choose an advertising platform. Many participants mentioned learning about a platform from interactions on chat forums with other workers. For workers who do not like using the internet or who prefer face-to-face interaction, they sought out recommendations from colleagues met through their local sex-worker organizations.

If an advertising platform is viewed favorably by the community then it is more likely to be used. For example, P23 said that their *“first criterion”* for adopting a new platform is whether it is used by their colleagues. Similarly, P18 said, *“[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.”* They went on to explain that if others were using the platform, this reassured them that it was safe to use.

Community recommendations often informed safety and usability considerations. Participants described how hearing that others were using a platform made them feel safer in using that platform themselves and explained that recommendations from the community helped them narrow down a set of platforms to consider using to advertise.

Platform Popularity. Relatedly, platforms that are popular among clients are also more likely to be used. Some workers we interviewed mentioned using popular platforms, even though they had usability issues or were not aesthetically appealing. For example, P16 commented, *“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.”*

Broad popularity was not always important, however. Some workers mentioned using platforms that were location-based and offered focused visibility into a location-based client base instead of more broadly popular, or more usable platforms.

In some cases, the most popular platforms are difficult for sex workers to use. P2 shared how sex workers in Germany struggle to advertise on mainstream social media platforms because of the Jugendschutzgesetz (Protection of Young Persons Act), which regulates the advertisement of media that is “harmful to young persons” including sexually explicit content:

“[With youth protection], we’re not really tolerated on social networking sites. That is an extremely big problem for networking. Also for advertising... If you always have to pay attention to what words you use, which search terms you use. And then these cryptic characters always pop up. People use the most obscure things as grounds to be defamatory” (P2)

Use of Multiple Advertising Considerations. Most participants considered more than one of the factors above before selecting platforms on which to advertise. After either learning about a platform from other workers or from their own research, most workers did further research into the platform and then went to create an account, staying alert to safety and usability considerations during that process.

In addition to turning away from a platform for safety or usability reasons, workers might decide not to advertise or to stop advertising on a popular platform if they find that the platform has a lot of “low quality clients,” or the platform has a reputation of having bad clients. Those we interviewed provided many examples of such bad clients: non-serious clients (i.e., clients pretending to be interested in order to collect explicit photographs but who never schedule an appointment), “boundary pushers” (i.e., clients repeatedly asking for services the worker made clear they do not offer), bots and fake accounts, and cheap clients who attempt not to pay for services. Regarding the latter, P19 said they stopped advertising on one popular platform because, *“it’s a race to the bottom, price-wise... I was always too expensive for the [popular platform] people.”*

4.2 Payment Processing

Technology has also impacted how sex workers collect payments 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. Although many of these payment platforms function outside of the U.S., they conduct business within a U.S. legal framework that classifies sex work as illegal. Thus, many choose to prevent sex workers from any country from doing business through their platforms. This is true across most major payment platforms.⁵ Consequently, P16 explains, *“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.”*

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 stops performing sex work, they may no longer be able to use mainstream payment platforms even for non-sex-work purposes. Two participants describe stories and experiences with account freezes and lifetime bans:

“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 platforms, none of the sex workers we spoke to used Bitcoin or other cryptocurrencies. As explained by P3, *“I’m not enough of a techie for that.”*

Instead participants worked around these issues using one of three approaches. First, some participants created payment accounts with their manufactured identities and linked these to bank accounts created by friends or family. Others created formal businesses, the names of which they kept separate from their sex-work identities, through which they processed payments. However, as one participant noted, creating a business is costly and not an option for all workers. Third, the majority of participants simply accepted cash payments. Many of our participants worked in Germany, a cash-based society [59]. Their clients are already used to paying cash for most services and thus requesting cash is socially acceptable.

4.3 Vetting

Many of the sex workers we spoke to “vet” (i.e., verify the safety of) potential new clients before meeting them [12, 13]. 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 up to an appointment. Our participants use three types of strategies to vet clients. First, they may leverage tools provided by sex-worker-focused advertising platforms such as a rating systems for clients and workers as well as directly looking up clients.

Second, workers may vet clients by searching them online using the information they collect about them (e.g., name, phone number). This strategy has also been found in online dating [19]. Third, workers may vet clients through “word of mouth references” from the

⁵See the list compiled by Hacking//Hustling for an up-to-date list of platforms that ban sex-work transactions [24].

sex-work community. Workers reported using one of three methods to vet clients through the community: asking other sex-worker colleagues directly, searching sex-work forums to get testimonials on clients (including looking for warnings posted by other workers), or asking directly on sex-work forums about certain clients. For example, P18 said, “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.” On the other hand, P23 uses forums to vet clients: “I use the internal forum from [popular advertising platform] in order to research client profiles, like to see if someone is warning us off or about fake profiles, etc.”

While many popular advertising platforms make it easy for clients to leave reviews on the profile of any worker, these platforms 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. As one participant described,

“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)

Three participants also mentioned how the General Data Protection Regulation (GDPR) hinders their ability to vet because, as a small business, they believe it makes the collection and storage of client phone numbers illegal. P2 shared how this can be weaponized against sex workers when clients discover they’ve been added to a vetting site: “clients that don’t think it’s very funny and then they lodge complaints regarding data protection.”

A minority of participants were unconcerned about vetting. Some felt that because their work was legal, they did not need to vet: they could turn to the police if there was a problem. For example, P20 said, “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’s opinions were shared by other German- or Swiss-born workers afforded with the privilege of not being immigrants and potentially undocumented. To them, the legality of sex work protects them from potential negative interactions with both clients and law enforcement.

Other participants did not vet due to their gender. P12 explained that being a man protects him from having to face gender-based violence and thus he did not need to vet: “[vetting’s] more relevant for women than men... 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.” Yet other participants explained that they choose not to vet because they find the vetting process too tedious to pursue or because sex work is something they do only part-time.

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)

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, P11 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.”* Workers may feel this separation is necessary to *“respect [their] sphere.”* P1, a cabaret worker, explained: *“I don’t really like to give my [popular social media platform] to anyone I meet at work, that’s too personal.”* On the other hand, P15, an escort, noted that the separation is necessary *“for [my] privacy and respect for my environment...it feels weird to mix guests and private life.”*

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 so as to separate personal life from work (e.g., not giving out social media usernames to clients). Many of these, like keeping separate profiles, are similar to boundary regulation techniques the general population might use to manage their privacy and social interactions [74].

Regarding communication rules, P6 explained that they manage boundaries by being *“very particular in how clients have to contact me.”* P22 took a similar approach and described how they explain communication rules up front: *“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.”*

Instead of or in addition to using communication rules, many workers mentioned creating boundaries by having separate devices dedicated solely to their work. The separation helps them avoid any accidental context collapse between their sex work life and their private, non-sex-worker life and can help protect their mental health. As one worker explained,

“I have two phones; I have a private phone and I have an extra phone for my work... I have a second [non-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)

Other workers shared similar sentiments, describing the separation as allowing them to *“not always be on”* (i.e., to decide whether and when they want to respond to a client).

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. As an alternative, some workers maintain two separate numbers on one phone, alleviating the need to constantly switch devices.

Finally, a few workers did not feel the need to create such digital boundaries. In some cases, they used the internet only for work. For example, P8 explains, *“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.”* On the other hand, others did not feel the need to create digital boundaries because sex work was a part of their larger digital identity.

Making Exceptions. Sometimes participants described situations when they changed a boundary for a client.

“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)

Other workers shared similar sentiments. They viewed the movement of a digital boundary as another business transaction that could benefit both the workers and clients. As P2 shared, *“He [the client] sees me and I see him on my bank statement”.* Such digital boundary movement could include accommodating client preferences for a particular payment method or communication platform.

Workers were typically only open to adjusting boundaries for long-time clients with whom they had an established relationship. One worker explains:

“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)

Occasionally, boundaries with certain long term clients are different than those for newer clients because the worker was inexperienced when setting initial boundaries. For example, one worker explains that they regret not setting their boundaries more carefully at the beginning of a client relationship:

“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)

Other participants echoed similar sentiments, noting that the way they set boundaries and respond to violations came as a result of previous experience with a client getting too close or violating boundaries.

5 GAPS IN SEX-WORK TECHNOLOGY

The sex workers we interviewed used technology for a myriad of business purposes. However, there were notable gaps they described in the technologies available. First, participants 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 workers [30, 31], many online platforms actively discriminate against sex workers. While this happened frequently with payment processors, as described in Section 4.2, 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. For example, one participant says:

“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)

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: *“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).*

Many participants attributed the repeated de-platforming of sex workers [24] to the “American-dominated internet.”

“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)

“Because [the payment processing platforms] are all based in the [U.S.]... None of them will legally allow sex workers to use their services, they can’t.” (P16)

As part of the American-dominated internet, some workers mentioned policy-related restrictions placed on them due to U.S. laws, such as FOSTA-SESTA 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 [57] and are consistent with the findings of Hacking//Hustling, a sex-work research and advocacy organization that maintains a list of platforms that do not allow sex workers [24].

5.2 Parasitic Sex-worker-focused Platforms

Above, we described how non-sex-work-specific platforms cause harm by de-platforming workers. In this section, we focus on the harm caused by sex-worker-focused platforms. 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. Two workers described their experiences with having their content stolen:

“[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, like 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. Some participants mentioned not taking legal action because it is “too laborious.” Others note that the intersectionality between their marginalized identities complicates their ability to take action, echoing findings from prior work that sex workers working illegally feel restricted from seeking out assistance for physical harms such as assault [53]:

“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.

One participant explains their frustration with the lack of sex-worker involvement in the design of sex-work technologies:

“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 technology] 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.” (P8)

These responses highlight the challenges trans and other gender non-conforming sex workers faced in using sex-work platforms. The heteronormative design of many sex-work platforms made participants feel unwelcome and limits the platforms and resources they have access to. As one participant explained,

“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)

Issues with a lack of inclusive design, especially gender-inclusive design, are not restricted to sex-work platforms. Prior work has examined the negative impact of, for example, Facebook's “real-name policy” [14, 21], which was mentioned several times by our participants as well.

P16 suggested that such inclusive design issues could be best solved by ensuring that design teams include sex workers as consultants or team members. They 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)

In the next section, we offer suggestions for how technologists can approach inclusive design in the context of sex-work technology.

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 and 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 cisgender women and clients being cisgender 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 [57].

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 [45, 49, 76], 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 [16] that created Tryst [70], an advertising platform, and Switter, a sex-work social media space [66].

Sex workers come from different social classes and educational backgrounds [57]. 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 is not due to 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 [68].

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 [1]. 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 like the loss of safe advertising platforms [69].

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 have been shown to harm multiple marginalized communities beyond sex

workers, including American Indians [37], trans people [14], and drag queens [42], 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 [21]. Beyond penalizing users who may be working entirely legally, this means that a sex worker who stopped working may face consequences indefinitely and 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 [4] and critiques of data universalism [43].

6.3 Tensions with Regulation

While sex workers and allies are unable to change how American platforms are discriminating against them (and others) globally, sex-work platforms that are owned and operated outside the boundaries of the U.S. may offer an alternative.

However, while U.S. moral attitudes and laws such as FOSTA-SESTA were most cited by our participants as causes of discrimination on online platforms, other regulations outside of the U.S. have also created challenges.

As mentioned by our participants in Section 4.3, the GDPR has also created barriers to storing and sharing information about aggressive clients, and in some cases may even put sex workers themselves in legal trouble for participating in important safety procedures. Additionally, specifically in Germany, the Protection of Young Persons Act was cited by participants as a barrier to advertising on major mainstream platforms because erotic advertisements may be classified as media that can harm minors under the law.

No matter where they are hosted and run, platforms supporting sex work, such as for vetting or advertising, are likely to face increasingly complex internet regulation. Digitally-mediated sex work has a set of constraints that are unique to the profession, like the need to share information about physically dangerous clients. These constraints are closely tied to the safety and success of sex workers. Thus, regulations should take the sex industry into account directly in considering the impact of new regulations.

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.

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 [61] suggesting that sex workers are likely to be more dependent on technologies than ever before. Once allowable again, in-person sex work is likely to become increasingly blended with digital sex work. Thus, research such as that presented here, which examines the benefits and failures of technology in sex work for an HCI audience is critical.

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?