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Information and Communication Technologies in Commercial Sex Work: A Double-Edged Sword for Occupational Health and Safety

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Abstract: Over the previous decade, there has been a notable shift within sex work marketplaces, with many aspects of the work now facilitated via the internet. Many providers and clients are also no longer engaging in in-person negotiations, opting instead for communications via technological means, such as through mobile phones, email, and the internet. By analysing the qualitative interviews of indoor-based providers, clients, and agency managers, this paper addresses the occupational health and safety concerns that indoor sex workers experience in the digital age, as well as how technology use can both support and hinder their capacity to promote their health and safety. Using thematic analysis, we arrived at three salient and nuanced themes that pertain to the intersection of sex work, technology use, and occupational health and safety: screening; confidentiality, privacy, and disclosure; and malice. As socio-political context can affect the occupational health and safety concerns that providers experience, as well as their capacity to prevent or mitigate these concerns, we highlight our findings in light of prevailing societal stigma and a lack of legal recognition and protections for sex work in Canada.

Keywords: indoor sex work; stigma; criminalization; Canada; technology



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1. Introduction and Literature Review

The topic of occupational health and safety among adults engaged in commercial sex work has garnered increasing attention from researchers over the past several decades ([Global Network of Sex Work Projects 2013](#)). While the initial focus of research in the area emphasized street-based and third-party-managed marketplaces (e.g., escort agencies and brothels), the ubiquitous nature of the internet and related information and communication technologies (ICTs) have contributed to shifting occupational dynamics that warrant attention ([Argento et al. 2018](#); [Kille et al. 2017](#); [Sanders 2008](#); [Sanders et al. 2018b](#)). ICTs are creating unprecedented opportunities for sex workers to determine how they will conduct business and allowing for greater control over their work ([Pitcher 2015](#)). The increased use of ICTs has also been associated with increase depression, isolation, and violence among sex workers, but the mechanisms by which these occur remain unclear ([Bungay and Guta 2018](#); [Minichiello et al. 2015](#)). More research about the interrelationships between ICTs, their uses, and sex workers' occupational health and safety is urgently needed.

Generally, service providers experience significant threats to their occupational health and safety, including physical and sexual assault, robbery, violation of privacy, harassment, and non-payment by clients ([Bungay and Guta 2018](#); [Bungay et al. 2012](#); [Church et al. 2001](#); [Harris et al. 2011](#); [Jones 2015](#); [O'Doherty 2011](#); [Sanders and Campbell 2007](#)). ICTs are also contributing to new threats, including the inadvertent disclosure of their status as a provider to family or general public, harassment and threats, persistent unwanted contact or stalking, and the misuse of information, including images ([Campbell et al. 2019](#); [Sanders et al. 2016](#); [Sanders et al. 2018a](#)).

ICTs have allowed sex workers to mitigate threats to their occupational health and safety, such as those from potentially violent clients. ICTs have shifted initial communications away from the immediacy of in-person initial contact to assess suitability, negotiate fees, service, and payment. Instead, much of these discussions are happening via the use of ICTs such as mobile phones, email, and various online communication platforms prior to any in-person engagement (Argento et al. 2018; Sanders 2008; Sanders et al. 2018b). Internet-based search engines allow workers to verify and collate information about potential clients as a means to assess their suitability (Argento et al. 2018; Campbell et al. 2019; Jones 2015; McLean 2015; O'Doherty 2011; Sanders et al. 2018a). Sex workers can assess the language and tone of emails and text messages to determine the risk a potential client may pose, and they may refuse to respond or block communications if needed (Argento et al. 2018; Campbell et al. 2019; Kille et al. 2017; McLean 2015; O'Doherty 2011; Sanders et al. 2018a).

As sex work marketplaces shift from the street to the screen, research addressing the occupational health and safety issues of indoor and internet-based providers is emerging. Unfortunately, the existing body of knowledge is largely limited to countries that have vastly different socio-political and legal contexts than Canada, such as Australia, the United Kingdom, and the United States. As socio-structural factors such as the law can impact both the occupational health and safety concerns that providers experience, as well as the prevention and mitigation strategies that they employ (Bungay and Guta 2018; Deering et al. 2014), it is important to generate knowledge that is specific to the Canadian context.

In this paper, we examine the interrelationships between ICT use and the occupational health and safety concerns of sex workers within a specific socio-legal Canadian context. We contribute to the urgent need for empirically-derived evidence necessary to inform public initiatives aimed at reducing stigma and discrimination toward indoor sex workers to better address their health and safety needs.

2. Theoretical Considerations

Defining Occupational Health and Safety

All employment sectors encounter work-related health and safety concerns that are shaped by the immediate environment and the larger social, economic, political, and historical contexts in which work occurs (Gerlach et al. 2017). Such concerns can and do result in negative sequelae for the workforce and workplace (Reese 2017). In the most general sense, occupational health and safety refers to a system of policies, procedures, and practices that aim to optimize working conditions that reduce the likelihood of work-related injuries and illnesses (International Labour Organization 2016). Occupational health and safety also aims to foster workers' emotional, social, and financial wellbeing (Bungay and Guta 2018; Sanders et al. 2018a) and, as such, is concerned with the immediate working conditions and socio-structural features of society that can promote or negate the health and safety of the workforce (International Labour Organization 2016).

Though there are many facets to the working conditions experienced by sex workers, stigma and legal regulation are particular socio-structural features of occupational health and safety of importance in our study (Benoit et al. 2017; Benoit et al. 2018; Bungay and Guta 2018; O'Doherty 2011). Sex workers regularly experience symbolic stigma (Herek et al. 2005), where they are perceived as contributing to societal harms such as crime, disease, and moral corruption. They also experience what is known as "whore" or "prostitution" stigma, which equates to selling honour for base gain (Benoit et al. 2017; Pheterson 1993). These various stigmas play out specifically to affect workers' occupational health and safety through various socio-structural sources, including at the macro (e.g., laws, regulations, and policies), meso (e.g., the justice and health systems), and micro levels (e.g., disapproval by the general public and devaluation by fellow providers) (Benoit et al. 2017).

In Canada, legal regulations have not taken an occupational health and safety approach that recognizes sex work as a legitimate occupation, a valid source of income, and a rational and purposeful choice for those who engage in this work. In 2014, Bill-36, The Protection of Communities and Exploited Persons Act was put in force. The overarching

objective of this Bill was to reduce the demand for sex work, deter participation, and ultimately abolish sex work (Department of Justice 2017). While Bill-36 does not criminalize the selling of sexual services, notable offences include: (1) purchasing sexual services, (2) receiving financial or other material benefits from the sexual service provision of others in exploitative circumstances, and (3) communicating for the purpose of selling sexual services in locations where the presence of children could be reasonably expected (e.g., schools, playgrounds, and day care centres) (Department of Justice 2017). Because we know that the occupational health and safety concerns that sex workers face, as well as the strategies they can employ to help prevent or mitigate these concerns, are both shaped by socio-structural conditions such as stigma and legal regulation (Benoit et al. 2017; Benoit et al. 2018; Bungay and Guta 2018; O'Doherty 2011), we intentionally integrated these specific contextual features into our understanding of occupational health and safety.

3. Methods

Data were collected as part of a national, mixed-methods study examining the ways in which sex workers, clients, and third parties (e.g., managers, booking clerks, and security) use information and communication technologies (ICTs) to facilitate commercial exchanges within the semi-criminalized context of the Canadian commercial sex industry (2016–2017). For the purpose of this paper, we specifically drew on qualitative interviews with 35 sex industry actors to analyse the role of ICTs in sex workers' occupational health and safety.

3.1. Sampling and Recruitment

A multimethod recruitment strategy was used, including posters in public spaces, online banner ads on popular internet-based classified ad sites and review boards, the word of mouth networks of participants and sex work support organizations. Participants were invited to share recruitment information with colleagues and peers, and we maintained a study website and blog to provide updates and respond to general questions about participation. Recruitment material detailed the inclusion criteria: people of any gender who were aged 18 years or older and had previously and/or were presently using ICTs to sell or pay for sexual services. Exclusion criteria were those unable to communicate in English or those who did not meet the inclusion criteria. Interested participants contacted the research team by phone or email to review eligibility criteria and expectations for participation. All of whom emailed or called were eligible, and only one contact declined an interview. No participants withdrew from the study.

3.2. Data Collection

Semi-structured interviews were utilized to gain an in-depth understanding of participants' experiences and perspectives concerning their ICT use and the interrelationships between ICTs and occupational health and safety (Patton 2015). Interviews lasted 30–90 min and were conducted in person or by phone, depending on the participants' choice and availability. Interview guides were developed by drawing on existing literature and the expertise of the research team; all focused on experiences of and decision-making regarding ICT use, with questions tailored to each participant sub-group. People engaged in sex work, including providers and third parties, were asked about ICT uses in advertising, determining the interest or suitability of clients and providers for an in-person meeting, and other operations associated with their work. Clients were asked about their experience of using ICTs in locating and making contact with potential providers and their decision-making associated with ICTs in this context.

3.3. Data Analysis

This study adhered to an inductive analytic approach guided by Thorne (2008), through which we sought to find patterns and variations in participants' experiences to better understand the phenomenon of ICT and its relationship to occupational health and safety across varied sex work industry-related activities. All interviews were transcribed

and uploaded to NVivo11™ to facilitate analysis. An initial reading of the qualitative interviews was completed to generate broad categories apparent in each of the participants' experiences. Transcripts were then compared and contrasted to identify emergent patterns to see whether they reflected our understanding of participants' experiences or discredited our interpretation (Thorne 2008). To ensure rigour, findings were compared with audio-taped interviews, memos, and transcriptions to verify the authenticity of the data. Initial thematic codes included: using technology to advertise, screen, and communicate; using technology for payment; posting photos, technological nuances, and traps; malicious and degrading reviews; unconsented use of pictures and videos; avoiding scams; and being outed and the risk for blackmail. These codes were subsequently regrouped into theoretical codes guided by our theoretical tenets, including occupational health and safety, stigma, and the current legal context of the sex work industry in Canada. Finalized thematic categories were informed by the extended literature on the occupational health and safety implications of technology use in sex work, both in terms of the occupational health and safety concerns that workers experience and the prevention or mitigation strategies that they use.

4. Results

The participants had varied roles within the commercial sex industry, including dual roles such as sex worker and client or client and third party (see Table 1). While a few of the providers had worked in outdoor settings, indoor settings were the most typical. Likewise, the vast majority of clients we spoke to attended to services offered indoors. Clients and providers engaged in the industry in diverse locales including the providers' pre-established place of business (e.g., in-call) or another mutually agreed upon setting such as a hotel or the client's home (e.g., out-call). Information and communication technologies were essential elements of the work setting and activities. Online classified advertisement platforms were common, as were review boards where clients rated and discussed their experiences within the industry. Personal websites, Twitter, Instagram, Facebook, email, phone calls, and text messaging were additional advertisement and communication platforms, illustrating the ubiquitous use of ICTs within the industry. We did not use a standardized process to collect demographic information, but we noted in our field notes how people described themselves. Some participants mentioned their age or approximate age, and these participants ranged in age from their 20s to their 50s.

Table 1. Participant characteristics (n = 35).

Role (s)	Gender	n (%)
Sex Worker	Male	4 (11.4)
	Female	11 (31.4)
Client	Male	15 (42.9)
	Female	0 (0)
Third Party	Male	1 (2.9)
	Female	0 (0)
Sex Worker and Client	Male	2 (5.7)
	Female	0 (0)
Client and Third Party	Male	1 (2.9)
	Female	0 (0)
Sex Worker and Third Party	Male	0 (0)
	Female	1 (2.9)

An analysis of the data illustrated that the sex work participants experienced a number of occupational health and safety concerns situated within the nexus of societal stigma and a lack of legal recognition and protection for engagement in sex work. To help illustrate

these concerns, we present the findings through three interrelated themes that demonstrate how providers leverage technological mediums (such as mobile phones, email, and the internet) to formulate strategies to counter, minimize, or resolve these concerns, and/or how their use of these mediums of technology can exacerbate these concerns and hinder their occupational health and safety. As the themes are inherently interrelated, it is possible that the quotations we present under one theme could also be applicable to a different theme. Overall, we selected quotations that best supported our thematic narrative and illustrated the salient points put forward in our analysis. We intentionally categorize participants as provider or client in noting the role of the participant in the subsequent data excerpts to support participant confidentiality. While all participants' interviews were included in the analysis, the sample size for third party roles was relatively small and the community within the industry is close knit.

4.1. Screening

ICTs and the types of communications they afforded were essential to screening, defined by the participants as initial processes to determine the possibility of a positive client encounter. Screening enabled providers to assess compatibility, credibility, and the fiscal, physical, and emotional safety of a potential client prior to an in-person meeting. Some screening occurred 'passively' via information communicated through providers' online advertisements. Advertisements enabled clients to assess their fit with a provider, thereby potentially decreasing the likelihood of an incompatible or unsafe encounter, and working as a way to avoid time-wasting on behalf of both parties. Additionally, sex workers identified this as a way to help reduce the detrimental economic impact of unpaid time spent screening:

What kind of image do you want to present so that you get the type of clients you want? You have to take that into consideration. It's basic marketing. It's just a question of really thinking of what is it that you want to present and how you're presenting it [in your ad] so that you get the right kind of client.—Provider 02

Clients and providers used additional screening strategies via text-based (e.g., instant messaging and email) and voice (e.g., phone) communications. Language was monitored and assessed for tone and sincerity. Communications from would-be clients of clear preferences, the services they were interested in, and their expectations were described as indicators of sincerity. Some were cautious about how clients addressed them, noting that being called anything other than their name was a warning of potentially aggressive or disrespectful behaviour. Effort in communication was used to assess intention, where greater effort assessed by longer and more in-depth communications was considered to represent sincere or 'real' potential clients. Some providers also integrated activities to assess effort by requiring potential clients to directly obtain contact details through their website link embedded in an online advertisement.

I want to see people who actually take the time read my website, to go find my email address, which already narrows down the clientele. I make people jump through various hoops, and the more people are willing to jump through hoops, the happier I seem to be in my work.—Provider 10

Communications limited to rates or immediate availability were dismissed by providers as insincere, untrustworthy, and disrespectful. Often described as "pranksters and trolls," people communicating this way were viewed as potentially harmful to providers' emotional wellbeing, noting "they don't really care about me" and "they just want to fuck." Many providers also spoke to the stability of a would-be client, choosing to disengage with those who have a sudden shift towards aggressive behaviour without apparent provocation.

While texting, emailing, and other forms of non-verbal interaction were common, people spoke eloquently about communicating directly through phone conversation as critical to the screening process:

I need to talk to them and feel them out and hear them to screen them, or just getting a vibe about a person, like I can't get a vibe out of some typed up words.—
Provider 06

However, the role of phones for screening was not limited to voice communications. How and when phone numbers were used illustrated the incredible complexity of this technology for screening and occupational safety. Phone numbers were not consistently shared freely between providers and would-be clients. Some clients reportedly blocked their numbers for fear that they were being set-up in some way to be publicly identified as a sex work client. These fears were exacerbated by the legal context of the criminalization of seeking and paying for sexual services. However, blocked numbers were not well-received by providers. Though they recognized clients' legal vulnerabilities, they expressed concerns that blocked numbers could indicate potential predators or insincere clients, and they noted that the ongoing advancements in ICTs further enabled people to hide personal information while simultaneously creating false personas, thereby exacerbating risk of harm.

The law, that's by far the worst thing. [. . .] It makes everything more difficult in terms of the screening and using technology and internet programs and websites to screen clients. They [clients] don't want to participate in that.—Provider 07

There is a whole way that the guys hide who they really are. The smart ones are able to figure out how to circumvent our ways of figuring out who they are. So that whole concept of somebody being able to create a phone number, create a persona, and I don't catch that this is that stalker from three years ago. They come back in a different form, so either a different email or a different name or a different phone number, and you don't necessarily catch it right away.—
Provider 05

Client participants were aware of unsafe working conditions for providers and described many strategies they perceived as mitigating some of the challenges in communicating sincerity and trustworthiness during screening activities.

For a reference, you may contact so and so at this number or at this email address. I would contact the other lady that I've seen before and who is willing to provide a reference; then, the provider they will talk to each other or text each other, and just to confirm I'm who I am and that I'm a good client.—Client 03

Sex industry review boards provided another essential screening strategy. Clients recognized the vulnerability of sex workers to unsafe working conditions and discussed the importance of review boards as a resource to help workers avoid harm.

There is a private section specifically for the providers. That's where they can exchange information largely around their safety. I know there is a section where they can exchange information on bad dates and things like that.—Client 08

Providers additionally relied on networks with other providers, using group texts to communicate details about a 'bad date'—a term used to define experiencing specific types of harm associated with client actions such as disrespecting pre-established boundaries, pressuring the provider for more time, attempted or actual non-payment, non-consensual condom removal, and physical and sexual assault. It is notable, however, that providers had to experience egregious unsafe acts and harm while working to enable communications to protect others against bad dates.

I network with other providers that I trust, and we have lists of phone numbers of the people we know we want to avoid. We'll say 'hey I had this experience' or 'what do you think of this phone number? The texts are weird' or 'I didn't like the message they left.' Or we'll have somebody try to use a different number, and we'll relay [. . .] 'the person is at it again, here's his new number.' Any news of somebody that's a bad call, we just put it out there. We're texting each other and emailing each other. [. . .] We'll talk over the phone. It's like we each have our own office and we'll all connected.—Provider 13

The ability to screen was crucial in helping to promote occupational health and safety for providers. Providers reported spending less unpaid time screening through poor quality clients—communications that rarely resulted in an appointment. Providers were also able to reduce instances of harassment and verbal abuse, reporting that they felt happier emotionally.

4.2. Confidentiality, Privacy and Disclosure

The socio-structural context of the commercial sex industry, particularly the illegality of paying for sexual services and the stigma and discrimination associated with sex work, further created occupational hazards. These hazards were, in turn, exacerbated by the relative dearth of formal recognition and protections for people engaged in sex work. One particular source of harm pertained to the non-consensual public disclosure of working in the sex industry, an experience known as ‘being outed.’ While confidentiality was also an issue for clients’ use of ICTs during screening, the issue of non-consensual disclosure was an additional occupational concern for providers with grave consequence. These non-consensual disclosures were heavily influenced by the operational features of ICTs and the security oversights in protections afforded in technologies. Though ICTs were critical to enable providers to undertake their work, these technologies simultaneously created a vulnerability to loss of privacy and confidentiality, and they required substantial technological knowledge and skills for people to protect themselves. Knowledge and skill were developed over time, usually through trial and error with significant harm, particularly from accidental non-consensual disclosure.

Providers worked diligently to avoid accidental non-consensual disclosure, especially in the context of being outed to family and friends. Avoiding accidental non-disclosure and/or removing oneself from an online presence if disclosure occurred was complex because it entailed numerous technologies and platforms. These activities, similar to screening, were undertaken during unpaid time and regularly required a steep, time-consuming learning curve. Providers’ advertisements were on several classified and review board platforms, and many had personal websites. They also often had multiple smart phones to separate personal from professional lives. These phones involved a plethora of applications such as email, masking apps to hide personal identifying information such as location and phone number, and internet browsers with advanced privacy and security functions.

I have two separate lines for my life. [. . .] The phones are set up with different ringers. My voicemail on my business line indicates my availability. [. . .] It’s very important for privacy and discretion to have a phone number that is strictly for the business.—Provider 13

I don’t have my sex work email attached to my mail app, like the mail app on my iPhone. Instead, I log in on a browser and it’s all just web-based. [. . .] I have friends. They’ll have an app and all their emails will go into their mail app, and so they need to make sure to reply from the right email. I can’t reply to my aunt from my sex work email.—Provider 04

The threat of being outed carried with it significant financial, emotional, and psychological harms associated with sex work-related stigma and the gaps in financial support during economic hardships. Being outed regularly required removing an online presence, thereby contributing to a loss of business and the expense and time to become re-established under another identity. For providers with children, the impact for these relationships was severe.

You get outed and you’ve got to take your shit down really quick because you have kids or because your husband is going to use it in your divorce settlement or your custody battle.—Provider 04

While being outed was perhaps the priority worry, providers experienced many other privacy and safety concerns related to technologies that permitted sharing across multiple

devices and platforms, particularly the covert connections between their phone number and social platforms such as Facebook and Instagram. Often these connections went unrecognized and created situations of unwanted communications from clients outside the professional boundaries of the provider–client relationship (e.g., attempted ‘friending’ on Facebook). In some instances, these connections contributed to situations of stalking and other forms of unwanted contact.

He found my Instagram based on my real number and started following me. I was so scared. I’m like ‘how does he know my name, who I am?’ I realized that’s why you don’t use your real number. Live and learn. I didn’t know they could find your Instagram through your number. There are so many things people trace you with.—Provider 09

The plethora of ICTs and the conditions associated with the ever-increasing shift to online platforms as a means for providers and clients to learn about one another created additional occupational hazards, with direct impact on providers’ privacy and dignity. The use of photos is a vital aspect of advertising for successful business operations. Posting photos safely, while an industry standard, necessitates knowing how to remove all geographical markers and other identifying information; this was a skill that was varied among the participants. Providers noted an awareness of risk associated with posting or sharing their photos and videos on the internet. Though the content was never meant for public consumption, the need to be competitive with other providers and create a successful business trumped these risks. Providers acknowledged that there is very little they can do to control what others choose to do with their content, even among those who were savvy in programming aimed at enhancing information security.

There are different little snippets of code that people do, Ctrl–Alt–C for copy, then it just blocks. [. . .] But you have to put that little piece of code into everything [. . .], and there are ways around that anyway. You can just have the image and do ‘print screen’ and then you have it. [. . .] Anybody who is computer-savvy in any way, shape, or form. And most people that would do stuff like that, they know. They know the ins and outs of the internet, and they know how to operate their computers. So they’ll get it no matter what.—Provider 03

The client participants acknowledged wanting to take pictures while also describing that they were regularly required to turn off their phones or keep their phones off and visible to the provider during their visit. While providers noted having videos and photos taken without their consent, the clients in this study considered any use of images to be under the providers’ control.

That’s an assumption that I’ve made [not to take pictures or videos]. Sometimes I’ll say ‘do you mind if I take a picture?’ and they’ll say ‘no.’ I’ve yet to have anybody say ‘yes.’—Client 14

It is clear that certain operational characteristics of ICTs exacerbate the risk of accidental disclosure for providers and that these characteristics may require providers to spend significant time and effort to learn how to navigate and mitigate this risk. However, the ability of providers to do so is severely impeded by prevailing stigma and a lack of legal recognition and protections.

4.3. Malice

While online sex industry review boards serve as indispensable technological resources in the promotion of occupational health and safety for providers by allowing them to more effectively screen clients (see above) and to exchange information pertaining to safety, this communication platform also has the potential to contribute to harm by facilitating the perpetration of threats and libel (i.e., a written defamatory statement that causes damage to a person, including financial loss and “statements that reflect adversely on a person’s character with respect to her trade, profession, or business”) (Osborne

2015, pp. 433–34). Providers were often the subject of malicious and degrading reviews where clients would post negative comments about them, e.g., suggesting that they were overweight or were odorous. These reviews not only affected the provider's emotional wellbeing but also caused damage to their professional reputation, with implications for their financial safety. In some instances, clients post negative reviews in retaliation to a provider asserting their boundaries, including reviews with false allegations.

I had one fellow insinuate that I was a trans person. He wanted to touch, my policy is no petting the muffin [vagina]. Don't even try it. And he tried it. So in his post he insinuated that I was hiding male parts.—Provider 13

Alternatively, providers spoke of how clients used the review board platform to threaten them to engage in sexual acts that may jeopardize their health, where clients indicated that if the provider failed to comply, they would post a negative review, thereby taking advantage of the provider's fears about reputational damage and threats to their livelihood.

He'd show up saying 'Look I'm clean [from sexually transmitted infections], I'll give you this much extra if you do it [have sex without a condom].' 'No, I don't do that.' 'Well too bad, if you don't I'm going to post a bad review and use the internet review sites to threaten you into submission.'—Provider 12

With the intention of promoting their physical, emotional, and financial safety, some providers engaged in review board 'wars' with clients and tried to defend themselves. However, providers noted that these virtual efforts at 'fighting back' were often counterproductive and could backfire on the provider, leaving them with little choice but to concede, apologize, and commit to 'doing a better job next time.' Other providers tried to preserve their professional reputation by asking the moderators of review boards to remove malicious posts. However, once a negative review is posted, intense debate typically ensues—"It's like an internet pile on. They just drown you in it." Thus, even when a moderator eventually removed the post, many people had already seen the content and damage to the provider's reputation and future business prospects was already incurred. Providers experienced barriers to promoting their occupational health and safety not only at the level of the review boards. They also reported being hesitant to reach out to police for assistance. This hesitancy was attributed to a combination of stigma at the macro (e.g., a lack of legal protections for engagement in sex work) and meso levels (e.g., at the level of the justice system), where providers described being under the impression that law enforcement takes limited action when the person reporting the crime or threat is a provider.

There was the guy who I was, I was trying to report extortion, the bareback extortion case. He [the police officer] says 'well,' he's looking out the window, he's not looking at me while I'm talking. He's like 'well, you know it's really hard to prove' and didn't even take a statement and wrote nothing down, so didn't take it seriously at all.—Provider 12

While the review boards indirectly affected providers' financial safety by way of reputational damage, technology also directly affected financial wellbeing in the form of financial scam. To remain anonymous, some providers established a company account to accept payment from clients through online payment systems such as PayPal. However, unlike cash payment, these online payment systems created a situation whereby clients were able to retract payment at a later date, even after services have been received, thereby limiting the providers' financial safety. In addition, in some situations, providers reported that in circumstances where they permitted clients to transfer funds electronically after service provision occurred, some clients did not follow through with payment and deleted or blocked their online profile or account so that the provider could not locate them. Again, due to the intersection of stigma and a lack of legal protections, there was little providers could do to promote their financial safety. Some chose not to alert law enforcement about

the financial scam due to fear of potential legal ramifications such as being arrested or charged.

If somebody tries to see you [. . .] and they don't follow through with the full payment or they try and [. . .] get away with not going through with the payment, which has happened to me a couple times, you actually can't do anything about it because at the end of the day, I can't go to police and say this person did this to me and they didn't pay me because I was supposed to do this for them.—Provider 08

Providers encounter many types of malice in their work. However, due to prevailing stigma and a lack of legal protections, when providers were subjected to libel and threats or when clients did not follow through with or retracted payment, providers did not feel supported in reaching out to the authorities. Rather, they were left to navigate these issues on their own, often to little resolution.

5. Discussion and Conclusions

Our findings illustrate that ICTs significantly shape occupational health and safety for sex workers in the adult commercial sex industry. In addition, any understanding of the impact of technology use on the occupational health and safety of providers must consider the larger socio-structural features of society and the capacities and limitations of the technologies themselves. Our findings specifically demonstrate that ICT uses and capabilities represent a 'double-edged sword' of harm and benefit that are only exacerbated within a current climate of state regulation that affords little or no occupational protections to those working in the industry.

The role that ICTs play in exacerbating social, financial, and interpersonal harm has increasingly been considered important to the health and safety of sex workers (Campbell et al. 2019; Sanders et al. 2016; Sanders et al. 2018a). Discussions of these harms have emphasized such issues as verbal abuse, harassment, and misuse of information (Bungay et al. 2012; O'Doherty 2011; Sanders and Campbell 2007; Sanders et al. 2018a). While our findings concur with earlier research, we expand information about the complexity of technologies that can allow for these harms to occur in covert ways. Hidden links between various social media platforms and embedded geographical markers in photos have resulted in the unintentional intermingling of professional and personal lives, and in situations of unwanted contact, stalking, and other forms of harassment. We refer to these covert links and markers that may lead to unsafe scenarios for providers as 'technological nuances and traps.' We also note that providers may be aware of and may be wary about the potential for these scenarios. In a way, these 'technological nuances and traps' act as a source of 'technostress,' which refers to stress that is created through ICT use and is "one of the fallouts of an individual's attempt and struggles to deal with constantly involving ICTs and the changing cognitive and social requirements related to their use" (Tarafdar et al. 2007, p. 303). Of the various types of technostressors, 'techno-invasion,' or the invasion of ICTs into an individual's personal life (Nimrod 2018), seems to have the most relevance for our study findings. Our findings illustrate the need for further investigations into technostress and occupational health and safety among sex workers.

The intersections between ICTs and the lack of occupational health and safety regulations as a source of financial harm also require attention. Though providers can require clients to pay prior to service provision to avoid non-payment (Bungay and Guta 2018; Bungay et al. 2012; Manning and Bungay 2017), we found that some clients could cancel electronic payments after receiving services, with little recourse by providers. This situation is exacerbated by the criminalization of payment for sexual services, which disallows enforceable occupational health and safety standards to prevent financial fraud. The lacking of standards also enables clients to engage in violations of privacy and respect through such acts as non-consensual filming and photo-taking, engaging in libellous activity in a public forum, and outing workers. The damage that stigma has for sex workers' health and safety is well-substantiated, so these acts have serious consequences including a loss of income,

disrupted intimate relationships with non-commercial partners, anxiety, depression, and an increased risk of violence (Benoit et al. 2017; Benoit et al. 2018; Jiao and Bungay 2019).

The experiential knowledge that sex workers, clients, and third parties gleaned over time as they used ICTs must also be considered. Little support is available to enable sex workers to build their capacities to use ICTs to foster occupational health and safety (Bungay and Guta 2018). However, over time, many sex workers have employed effective strategies to maximize business and promote privacy including having a separate phone, SIM (subscriber identity module) card, email, or web browser for work and using privacy specific software applications that have been noted in other research (Sanders et al. 2018a). Similar to other studies of internet-based sex work business models (Kille et al. 2017), they also created a specific web presence that allowed them to communicate their business practice. Importantly, over time, these learnings were regularly shared within communication networks among sex workers and clients alike. Novel approaches and interventions are urgently needed to foster the abilities of sex workers to maximize ICT use in their occupational activities.

This study contributes, in various ways, to knowledge that is specific to the socio-political and legal context of Canada on the occupational health and safety concerns that indoor sex workers experience, as well as how the use of technology can both help to promote and hinder occupational health and safety. By highlighting the impact of the current socio-political and legal environment on the occupational health and safety of providers, these findings can help inform evidence informed social policy discussions aimed at improving occupational health and safety for providers. We recommend that policy makers consider the impact of the current policy approach on the occupational health and safety concerns that providers experience, as well as on the ability of providers to counter these threats, when generating future policies pertaining to sex work in Canada. We also recommend the development and implementation of health and social programs to promote occupational health and safety for sex workers, as well as interventions with the goal of reducing stigma that is associated with being providers of sexual services, at the micro (e.g., individual), meso (e.g., the justice and health systems), and macro levels (e.g., policies and the media).

Finally, we acknowledge several limitations to our study. Our sample mainly consisted of providers who identified as female and clients who identified as male, not allowing us to fully account for the experiences of male providers, female clients, and transgender providers and clients. In addition, the use of a convenience sample and the self-selection of participants may be concerns, because providers and clients who were willing to talk about technology use and participate in the study may be more proficient at the use of technology compared to participants in the commercial sex industry who are not. Using different recruitment and sampling strategies might have yielded different results. Lastly, although it was clear that the study participants were incredibly generous in sharing their stories, experiences, and insights with us, due to the prevailing stigma that surrounds sex work and the semi-criminalized sex work environment in Canada, it is possible that participants were not entirely forthcoming. Drawing on some of these limitations, it would be helpful for future work in the area to address the experiences of male providers, female clients, and transgender providers and clients. It would also be worthwhile to examine these important issues with a larger group of stakeholders of the sex work industry, including law enforcement, sex work community organizations and advocates, and policy makers.

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Informed Consent Statement: Informed consent was obtained from all participants involved in the study prior to commencing interviews.

Data Availability Statement: In accordance with consent provided by research participants and to protect the confidentiality of individuals who are stigmatized, and who engages in activity that is not legally endorsed, the authors will not be sharing their full data set. Data supporting the reported results is available throughout the manuscript text in the form of participant quotations.

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