Discouraging the Demand That Fosters Sex Trafficking: Collaboration through Augmented Intelligence

Marcel Van der Watt

National Center on Sexual Exploitation, Washington, DC 20004, USA; mvanderwatt@ncose.com

Abstract: Augmented intelligence—as the fusion of human and artificial intelligence—is effectively being employed in response to a spectrum of risks and crimes that stem from the online sexual exploitation marketplace. As part of a study that was sponsored by the National Institute of Justice, the National Center on Sexual Exploitation has documented 15 tactics that have been used in more than 2650 US cities and counties to deter sex buyers from engaging with prostitution and sex trafficking systems. One of these tactics, technology-based enforcement and deterrence methods, has been used in more than 78 locations in the United States. This paper explores the issue of technology-facilitated trafficking in the online sexual exploitation marketplace and juxtaposes this with the use of augmented intelligence in collaborative responses to these crimes. Illustrative case studies are presented that describe how two organizations employ technology that utilizes the complementary strengths of humans and machines to deter sex buyers at the point of purchase. The human(e) touch of these organizations, combined with artificial intelligence, natural language processing, constructed websites, photos, and mobile technology, show significant potential for operational scaling, and provide a template for consideration by law enforcement agencies, criminal justice systems, and the larger multidisciplinary counter-trafficking community for collaborative replication in other settings.

Keywords: artificial intelligence; augmented intelligence; demand reduction; prostitution; sex trafficking; technology

1. Introduction

A range of multilateral legal obligations and political commitments geared towards discouraging the demand that fosters sex trafficking are in existence and mandate action from participating states. As a participating state of the Organization for Security and Co-Operation (OSCE) in Europe, and as a country which signed and ratified the Protocol to Prevent, Suppress, and Punish Trafficking in Persons, especially Women and Children of the United Nations (UN) Convention against Transnational Organized Crime [1] (hereafter Trafficking Protocol), the United States (US) has an obligation to discourage the demand that fosters trafficking for sexual exploitation. Article 9(5) of the Trafficking Protocol mandates that signatories strengthen legislative and other measures such as "educational, social or cultural measures" that seek to "discourage the demand that fosters all forms of exploitation of persons, especially women and children, that leads to trafficking". Article 9(5) of the Trafficking Protocol is also foundational to the relevant OSCE commitments [2,3] that give guidance on how the United States should carry out its anti-sex trafficking measures. Further, on 15 December 2022, UN resolution 77/194 (Trafficking in Women and Girls) reiterated the call upon governments to intensify their efforts to "prevent and address, with a view to eliminating, the demand that fosters the trafficking of women and girls for all forms of exploitation", and it implored countries to inculcate or amplify measures geared towards prevention, "including legislative and punitive measures to deter exploiters of trafficked persons, as well as ensure their accountability" [4] (p. 8). The Internet infrastructure, the online sexual exploitation ecosystem, and the countless technological tools available to its users to navigate the endless forays of the surface, deep,

and dark web, are critical to consider when acting on these obligations to implement demand reduction strategies in the US.

Since the advent of the 21st century, police departments nationwide have observed sharp increases in the use of the Internet for soliciting prostitution and a decline in their yield of arrests made in street-based stings and reverse stings [5–10]. Conventional reverse stings [11–15] are law enforcement operations targeting buyers who engage in purchasing sexual access to others. Following the widespread use of the Internet and the rise of online prostitution advertising, police conducting reverse stings began employing online decoy sex advertisements, which are posted by a law enforcement agent who poses as a prostituted person when transacting with the targeted buyer. These communications usually take place via text message or voice phone call. Law enforcement will call and text buyers from their official phones and do so using altered identities. An "in-call" service, in which the buyer arranges to meet the prostituting person at some location, is negotiated between an undercover officer and the buyer with the agreed upon location for the solicited sex acts usually taking place at a hotel room or law enforcement-controlled premises. When the buyer arrives, he is arrested and processed [11–15]. The expansion of online prostitution and its sex trafficking nexus, as well as the risks, costs, and labor intensity of conventional reverse stings, favorably positions the use of technologies as alternative means of pursuing primary prevention at a vastly expanded scale. Today, chatbots, artificial intelligence, natural language processing (NLP), constructed websites, photos, and mobile technology are woven into most of the technology-based enforcement methods aimed at discouraging the demand that fosters sex trafficking.

Scope and Delimitation

Accordingly, this paper examines the ways in which technology has been harnessed to discourage the demand that fosters sex trafficking, and employs a deterrence lens [16–20] to describe collaborative efforts by law enforcement agencies, technologists, and anti-trafficking role-players to dissuade buyers at points of purchase. In the US, the conduct of sex buyers in prostitution and sex trafficking are proscribed by various state and federal laws [21,22], while persons under the age of 18 who perform a commercial sex act are considered victims of child sex trafficking [23]. An established legal framework therefore undergirds efforts geared towards discouraging the demand that fosters sex trafficking. Several matters are beyond the scope of this paper and are not litigated. The decisions that determine the degree to which legal obligations to deter demand are enforced at the city, county, state, and federal levels, and the methods used to achieve them, are contingent upon a complex mix of legal, political, and social factors. Neither a survey of these factors nor a critical analysis of what appear to be irreconcilable philosophical debates surrounding prostitution public policy [24–28] in the US (or globally) were the focus of this paper, and nor was that of the larger research project from which the findings in this paper stem. This includes contentions around Internet governance and the relevance and impact of laws such as FOSTA-SESTA [29–32] in the US. Although the ongoing debates regarding artificial intelligence and ethics [33–37] are beyond the scope of this paper, the practical implications and compliance guidelines around issues of data protection and ethics [38–41] are explicated in the case studies.

The growing calls for collaboration between governments, the technology industry, and anti-trafficking stakeholders to fuse their efforts in response to human trafficking [42,43] as well as this Special Issue's focus on research findings and evidence-supported practices pertaining to multisector collaboration and the use of digital technologies in efforts to combat human trafficking both informed the aims and scope of this paper. Two organizations and their use of these technologies within collaborative settings are the subjects of this paper. It starts with an introduction of collaboration and augmented intelligence within the context of human trafficking combatting efforts, and continues with an overview of existing scholarship and practice around technology's role in sex trafficking perpetration and prevention. This serves as the theoretical foundation for presenting the two organiza-

tions, Street Grace and The EPIK Project, as illustrative case studies [44] that show much potential for scaling innovative collaborations and impactful efforts designed to deter the consumer-level demand[1] that fosters sex trafficking.

2. Collaboration and Augmented Intelligence

At the core of what has been described as a 'battle of wits' between systems that perpetrate human trafficking and systems that seek to combat the crime [45] is the "capacity to harness complexity and co-axe solutions from [a] volatile, uncertain, complex, and ambiguous (VUCA) landscape" [46] (p. 777). The required agility that enables this capacity is not the result of serendipity but is nurtured through cross-sector and human-centered collaboration that is often challenged by competing objectives, paralyzing bureaucracies, and incongruencies in values and priorities [47]. The importance of collaboration is consistently underscored in human trafficking scholarship. This includes collaboration as the lifeblood for success in human trafficking task force operations, interagency collaboration, and operational sustainability [48–51], and the understanding that efforts to combat sexual exploitation exist along a continuum of care that can reveal opportunities where strategic collaboration can influence prevention, intervention, restoration, and reintegration [52,53]. Placing survivor perspectives and leadership at the center of collaborative spaces can also influence policy and practice towards more meaningful results [54]. The addition of *partnership* to the existing foci of the federal government's initiatives, namely, prevention, protection and prosecution, demonstrates the increasing recognition of collaboration as essential at the national and local levels [55,56]. A fifth 'P'—participation—has also been proposed and denotes the active engagement of all multidisciplinary role-players and service providers in efforts against human trafficking [57,58].

The reliance on technology and artificial intelligence to strengthen collaborative efforts against sex trafficking and consumer-level demand reduction, have received a fair amount of attention in recent years [59–61]. The focus of artificial intelligence is largely on aspects such as computer science, datasets, and the sub-fields of machine learning and deep learning [62], whereas 'augmented intelligence' accentuates the importance of human collaboration with machines. As observed recently in the field of mental health, artificial intelligence (AI) chatbots are not yet able to fully replace human interactions. While having the capacity to improve efficiency, affordability, convenience, and patient-driven access, AI interfaces and chatbots "cannot be expected to provide the feelings of respect and subtle constellations of interpersonal supports necessary for a sense of social agency, inclusion and equity" [63] (p. 4). Among the ways in which the two organizations discussed in this study seem to eclipse a sole reliance on technology is how their operations include the interface between humans and "machines," and how they augment and amplify each other's strength while managing implicit weaknesses. Augmented Intelligence is considered as:

> [A]n umbrella-term used in media theory, cognitive sciences, neurosciences, philosophy of mind and political philosophy to cover the complex relation between human intelligence, on one side, and mnemo-techniques and computational machines, on the other, both understood as an expansion (also to a social and political degree) of human cognitive faculties". [64] (p. 203)

More simply, augmented intelligence refers to the merging of the power and strengths of AI with those of humans by "integrating AI systems into the day-to-day work of people to help them make better decisions" [65] (p. 1). Practitioners and their coexistence with technology and the application of artificial intelligence in counter-human trafficking initiatives are here to stay. This merits an engagement with the idea of augmented intelligence that differs from AI in that "many models of AI suggest that its purpose is to wholly supplant human intelligence" [66] (p. 451). To highlight the need for collaboration and augmented intelligence, and to show how Street Grace and The EPIK project espouse these concepts, it is important to reflect on technology-facilitated trafficking in the online sexual exploitation ecosystem and the nature of consumer-level demand that fosters sex trafficking. This will be followed by an overview of technological developments in response to these crimes.

3. Technology-Facilitated Trafficking

Latonero and colleagues refer to technology-facilitated trafficking as the "social and technical ecosystem wherein individuals use information and communication technologies to engage in human trafficking and related behaviors" [67] (p. 10). Pioneers that formed part of this online sexual exploitation ecosystem included the now defunct "Erotic Services" section of Craigslist and the website Backpage [68–70]. A 2017 report on Backpage by the Permanent Subcommittee on Investigations of the US Senate, which followed an extensive investigation into the prostitution advertising platform, found that the company knowingly facilitated child sex trafficking and concealed evidence of criminality [68]. Among the ways it facilitated sex trafficking was its use of an automated filter, which would strip key words such as "Lolita", "teenage", "amber alert", "little girl", "fresh", and "school girl" from prostitution ads posted to its site by third parties [68] (pp. 22–23). At the time, Backpage was involved in 73% of all reports of child sex trafficking from the public to the National Center on Missing and Exploited Children (NCMEC) [68]. Backpage was seized and shut down by the US Justice Department in April of 2018, which filed a 93-count federal indictment against seven individuals associated with the business [71].

Platforms now include several other classified advertising sites that facilitate the illicit sex trade [72–75], including other web-based interactive technologies used for the business of commercial sex. The latter includes online gaming systems, such as Xbox Live, and social media platforms like Twitter and Facebook [76–78]. It therefore comes as no surprise that the use of technology by sex traffickers and buyers is increasing. In tandem with cellular technology, the Internet offers its users the opportunity to stay connected interminably from any geographic location. The Internet's seemingly limitless supply of information is the same feature that supports its growing popularity as a venue that facilitates domestic minor sex trafficking [74] (among other crimes). Even though digital technologies such as mobile phones, social media, and the Internet have added significant benefits to every stratum of society at large, new opportunities and conduits for sexual exploitation have become equally diffused [67]. The expansion of online prostitution with its manifold manifestations [79–81] and the oft-indiscernible distinction between prostitution and sex trafficking [82] have made the online environment a flourishing ecosystem of sexual exploitation. These technologies increasingly impact every aspect of the sex trafficking cycle, and a functional understanding of their uses is a critical component for the multidisciplinary response to sex trafficking and commercial sexual exploitation of adults and children. Technology is used [83] in the recruitment phase by facilitating the identification, location, and contact of potential victims. This may include job advertisements or recruitment via social media platforms and dating applications. The exploitation phase may include technology being used to facilitate the sale of sex acts to sex trafficking victims via internet websites or live-streaming services [84]. Online prostitution advertisements associated with sex trafficking obfuscate [85] prostitution transactions, moving them from streets and bars to Internet-based forums, thereby obviating easy law enforcement detection. Further clouding the situation, online prostitution advertisements may include the use of coded emojis instead of words where the use of an umbrella emoji may denote condom use and a crown may signify services managed by a pimp. The use of a combination of letters and numbers from character symbols or interspersing text within a phone number are other methods of obfuscation [85].

Roe-Sepowitz explored the behavior and characteristics of a national cross-sectional sample of sex traffickers arrested for the sex trafficking of minors in the United States [86]. A total of 1416 sex traffickers were identified in a 6-year period from 2010 to 2015. Both the numbers of arrests and the use of technology by sex traffickers progressively increased annually during this period. Technology was used during the minor's sexual exploitation in more than two-thirds of cases ($n = 950$, 67.1%) by either advertising victims online or by furnishing a mobile phone to the victim. Online ads were used in nearly two-thirds of the cases ($n = 889$, 63.5%). The website Backpage was specifically used in more than one-third of these cases ($n = 592$, 41.8%), though the name of the advertising website was not always

provided in reports, so the incidence rate may have been higher. A disturbing finding from this study was the fact that there exists such a significant commercial market for sex with minors. Roe-Sepowitz notes:

> While the demand for sex is significant, the demand for sex with minors is especially important to note. Sex traffickers of minors are intentionally offering children for sex, and adults are intentionally engaging in sex with children with no compunction or inhibition. [86] (p. 627)

A 2018 study [74] by Thorn provides further evidence of the scope of the online sexual exploitation marketplace. A total of 260 survivors of Domestic Minor Sex Trafficking (DMST) who were contacted through 24 survivor organizations that spanned 14 states completed a survey that focused on understanding what role technology played in a victim's recruitment into, time spent in, and exit from DMST. One of the central themes from survey responses was that technology played an increasing role in the grooming and control of DMST victims. Findings included that 1 in 6 victims were trafficked under the age of twelve and that 75% of those who entered "the life" in 2004 or later were advertised online. Especially noteworthy are the study's findings related to interactions with sex buyers. Phone calls and texting remain the foremost methods of communicating with sex buyers. The study found that the majority of respondents said that they communicated with the buyers themselves (56%; $n = 139$). Among those with a sex trafficker, 42% ($n = 85$) stated that the trafficker communicated with the buyers while 51% ($n = 104$) said they communicated with buyers themselves. When sex traffickers do the communicating with buyers, there is a strong indication that the age of the victim is likely younger than 13 years old. Of the 104 respondents with a sex trafficker who communicated with buyers themselves, 87% were 13 to 17 years old when they entered the life. Conversely, those who reported that their sex trafficker conducted the communication with the buyers were significantly more likely to be younger when they entered the sex trade—of the 106 respondents who reported that their sex trafficker communicated with the buyers, 40% were 12 or younger.

The online commercial sexual exploitation landscape of the US has a global footprint with global ramifications. For instance, a US-based live "camming" website (streamatemodels)[2] was implicated in the successful prosecution of two sex traffickers, both Lesotho nationals, in a South African High Court [87] for the sexual exploitation of a 16-year-old minor in December 2019 (State v Seleso)[3]. The Pretoria Office of Homeland Security Investigations provided investigative support to South African law enforcement agencies as the website was hosted in the United States. The investigation revealed that the account used to exploit the victim had more than 6000 logins by sex buyers from across the globe to view the victim over the two-year period during which she was exploited. A 2022 report [88] also confirmed that several widely-used online prostitution websites in South Africa, some advertising on public roadways in close proximity to schools, were implicated in several successfully prosecuted sex trafficking cases and provide further evidence of the inextricable link between prostitution and sex trafficking. The global footprint and the egregious nature of crimes associated with the online sexual exploitation marketplace, the blurry line between prostitution and sex trafficking, and the fact that online prostitution provides a way to advertise that is not as easily detected by law enforcement [81] all necessitate bridging the gap between limited human capabilities and the new possibilities afforded by technological innovations.

4. Technological Developments in Response to the Online Sexual Exploitation Marketplace

Scholarship and operations pertaining to the expanding use of technology in crime deterrence provide promising insights into the strategic impact and scalability of these domains and the amplification of its dovetailing theory and practice [89–91]. The same applies to the application of technology, big data, and artificial intelligence with the aim of obstructing the growth of the online sexual exploitation marketplace. Researchers investigated computational approaches [92] that utilize text or meta-data/multimedia for

online sexual risk detection that included sexual predation, sexual grooming, sexual assault, sexual abuse, sex trafficking, and sexually abusive conversations. The research included approaches comprised of system architecture on text and multi-modal data (i.e., Natural Language Processing, Machine Learning). In their analysis of 73 peer-reviewed articles published between 2007 and 2020, researchers found that the majority (93%) of research has focused on identifying sexual predators after-the-fact instead of a more discerning approach that identifies potential victims as well as indicators that could enable the prevention of victimization before it occurs. They identified three types of online sexual risk detection in the extant literature. These included sexual grooming (75%), sex trafficking (12%), and sexual harassment and/or abuse (12%). In a study by Keskin [85] and colleagues, a variety of computational methods were used to present a framework for harvesting, linking, and detecting patterns in a dataset comprising more than 10 million advertisements linked to illicit sexual activities and sex trafficking. Their framework provides valuable insights that may assist law enforcement agencies to proactively combat sex trafficking networks, and it provides researchers with additional insights for developing advanced interdiction models that target illicit sexual activities. An analysis [93] of unstructured deep web data related to approximately 14 million prostitution advertisements used a machine learning framework that combines natural language processing, active learning, and network analysis. The research uncovered likely trafficking routes and provided large-scale insight into where and how victims are recruited—often through deception. The results enable more effective coordination and the prioritization of "resource allocation to maximize impact" [93] (p. 20) in a landscape where "social resources are often highly constrained" [93] (p. 20).

The essence of several technologies identified in this research combines "a text message back-end with an autonomous chat bot trained on conversations between sex buyers and undercover agents" [82] (p. 14). Once a buyer engages via text with a number from a decoy sex advertisement, the chat bot connects with the most appropriate response from the information and transcripts it was trained on. Implicit to this approach is the risk of law enforcement action to deter sex buyers [94] and using the opportunity to have conversations with buyers to raise awareness about the harms of sex trafficking while bringing about an attitude change towards buying sex [95]. Innovative concepts include chatbots, computer programs which can simulate human conversations with people via the Internet. One such chatbot is PrevBOT, [96] an AI-based Police Robot for Preventing Online Child Sexual Exploitation and Abuse initiated in a chatroom environment. Knowledge and research related to online automatic policing, forensic linguistics, criminology, machine learning, and the law underpins the conceptualization and development of PrevBOT by Norwegian researchers who seek to optimize its operation "in an effective, fair, and lawful manner" [96] (p. 2). Similarly, Terre des Hommes' Sweetie 2.0 [97] was a virtual female 10-year-old Philippine chatbot, which tracked, identified, and deterred individuals using the Internet for the purpose of sexually abusing children, and Street Grace's Gracie [98] is a US-based artificial intelligence chatbot that not only warns predators of the implicit risks and consequences of their actions but also provides them with trauma and therapy resources, thus further shifting the boundaries of innovation. In a similar vein, C3-Sex [99] is an example of an automatic software-controlled conversational agent that is deployed online and interacts with users autonomously. It uses NLP and is deployed on websites or in scenarios where it profiles the interests of suspects regarding online child sexual abuse. Researchers from Colombia and Spain conducted a 50-day experiment between April and June 2020, and connected C3-Sex to the online chat platform Omegle and typed "sex" as a conversational topic of interest. When a conversation between a user (suspect) and the chatbot ensued, the suspect's willingness to exchange multimedia content was confirmed. C3-Sex then proceeded to suggest Snapchat as the platform to exchange the multimedia content. Once the suspect left the chat room, C3-Sex closed the conversation and continued to analyze the interaction using profiling metrics and AI models. The 50-day experiment revealed that, on average, the C3-Sex smart chatbot can interact with 900 suspects weekly

and was able to stay online throughout the eight weeks of the experiment, with a total of 7199 users contacted.

In February 2018, the Cook County Sheriff's Office reported [100] on its partnership with Seattle Against Slavery during the 15th National Johns Suppression Initiative (NJSI) operation which ran from 7 January to 4 February and included more than 30 law enforcement agencies across 16 states. Ads were posted online that connected to chatbots posing as sex trafficking victims. The bots, with names such as 'Ariel,' 'Brook', and 'Cari', were said to "fluidly interact via text message with individuals seeking to buy sex". If a price for the service was eventually set and agreed upon, the bot sent a deterrence message informing the sex buyer that soliciting sex is a crime. During the campaign, the bot was activated in Boston, King County (Seattle), Los Angeles County, and Phoenix. A total of 9114 potential sex buyers were engaged, and more than 60% of sex buyers received the deterrence message. Cook County Sheriff Thomas J. Dart lauded the technology and commented:

> "This incredible technology helps to further the work done by law enforcement to bring attention to the exploitive nature of the sex trafficking industry and reduce the demand for purchased sex that serves to perpetuate a cycle of violence, mental illness and drug addiction for victims."

Data aggregation is another tool being utilized to help law enforcement identify and deter sex buying. Childsafe.ai, a software startup that deploys machine learning and active collection networks that monitor actors that "buy and sell human beings from within the surface, deep and dark web marketplaces in which those transactions occur" [72] (p. 10), delivers a Demand Deterrence Platform serving law enforcement anti-human trafficking units around the country to reduce the illicit finances pouring into their local sex trafficking economies. ChildSafe.ai also amplifies the ability to identify and respond to online sexual exploitation by mobilizing chatbots. When comprehending the conversations of a potential sex buyer, ChildSafe.ai delivers a customized deterrence message in which it warns the buyer of the legal and social ramifications of buying sexual access to others. In a 2020 example, several law enforcement agencies had implemented the ChildSafe.ai platform, which resulted in the cumulative engagement of 1477 potential sex buyers with an estimated total of 8500 customized deterrence messages being sent [101].

Through their principal technology tool Spotlight, Thorn also utilizes data aggregation and has reported [102] having identified 3977 children and reduced law enforcement investigation time by 61%. More than 2700 agencies are reported to be using Thorn tools, with the number of children identified since the inception of the technology totaling 24,366. Police investigators laud [103] the value and efficiency of Spotlight. According to Kyle Woods and Kyle Hartsock, detectives inside the Ghost Unit with the Bernalillo County New Mexico's Sheriff's Office, Spotlight is used to aggregate online data and enables the use of data gathered from websites. Apart from utilizing Spotlight for victim interviews, it provides much value in tracking "a victim's movement across the country, with exact dates and times of posts as well as when phone numbers changed (the trafficker picked her up, etc.). We have identified ads 6 months after the incident utilizing Spotlight, which, in one case, cracked open the case and lead to a successful prosecution of a child sex trafficker" [104].

Although not primarily focussed on discouraging the demand that fosters sex trafficking, ShadowDragon.io [105] endeavors to make the world a safer place by developing easy-to-use digital investigation tools that address the complexities of modern online investigations and augment the capabilities of in-house teams. The organization partners with nonprofits that share the common goal of ending human trafficking by using sophisticated digital tools and tested investigative methods. These tools enable human trafficking investigators [106] to identify where information is being talked about and enables the monitoring of specific areas of interest, including the DarkNet, online forums, chat rooms, data dump sites, and online marketplaces. Sites can be monitored "to pick up new leads and chatter". The tools also enable a "robust intelligence product output, enabling attribution, action and disruption".

In a 2019 ShadowDragon blog entitled "It's Hard Out There for a Pimp" [73], the organization asserts that sex traffickers are using the expansion of escort websites to "advertise their products to the world". An example of an online investigation using their OIMonitor tool is showcased by employing it on some of the largest escort sites in operation and searching them for potential sex trafficking ads. They reported that one data point has the potential to unveil hundreds of posts—many of which will be the same and possibly in different cities. According to ShadowDragon, a reason for repeated data could be that changing information in online posts has cost implications, and pimps may thus only purchase a limited number of ads. Posting the same data is also easier than creating new language for each post. When potential sex traffickers are identified by specific data points, they are added to an OIMonitor project that alerts the user when that data is posted. OIMonitor's historical search and alerting functionalities are therefore able to locate potential sex traffickers and setup alerts. The specific online investigation that was showcased in the blog was "put together in just under an hour" and highlights the remarkable contribution of technology to sex trafficking investigations.

5. Methodology

To combat the overlapping systems of prostitution and sex trafficking, criminal justice strategies and collaborative programs have emerged that focus on depriving these illicit markets of their sole revenue source: consumer-level demand. From 2008 to 2012, the National Institute of Justice (NIJ) sponsored a study, the "National Assessment of Demand Reduction Efforts", [107] that entailed the systematic gathering of information to determine the types and distribution of demand reduction tactics implemented throughout the United States. These efforts resulted in a typology of law enforcement and community-based tactics identifying 12 distinct methods for deterring people (overwhelmingly men) from buying sex or which sanction those individuals who seek to purchase sexual access. The study found that these tactics were used by law enforcement and community action groups in more than 800 U.S. cities and counties in efforts to deter this damaging behavior and to hold perpetrators accountable. The key product of that study was the Demand Forum [108] website, which launched in 2013. For 10 years, Demand Forum has provided information about demand reduction interventions in the United States, and its content has been updated and expanded through daily web searches, supplemented by periodic literature reviews or direct contact with a network of practitioners and other experts. While Demand Forum has continued to be a useful tool, much has changed since it was launched in 2013 and conceived years before then. The most significant development has been the emergence of new tactics using information and communication technology (ICT) to deter buyers and develop evidence to apprehend those actively seeking to purchase sex.

To keep pace with innovations and evolving responses to emerging threats, and to continue to provide useful support for practice and policy, the current study was initiated to build upon the methodology and knowledge base of the first National Assessment. In January 2021, work began on a new grant from NIJ that supported the current study entitled "National Assessment of Demand Reduction Efforts, Part II: New Developments in the Primary Prevention of Sex Trafficking" [109]. The methodology for curating new content about existing tactics and their implementation in U.S. cities and counties featured (1) Web-based surveys of law enforcement agencies, (2) interviews with practitioners, policy makers, program staff, and advocates, (3) web searches of open-source reports, and (4) reviews of prostitution laws in the criminal codes of all 50 states. Throughout, the research was guided by input from a panel of survivor content experts. These tasks have resulted in the identification of nearly 500 additional cities and counties that have implemented demand reduction tactics (for a total of more than 2650 cities and counties). Much of the research effort was directed toward understanding and documenting the use of information technology to detect, investigate, apprehend, and deter sex buyers that has emerged as a distinct and new class of intervention, which was prompted by a shift in the market for illicit commercial sex away from in-person solicitation and toward various

advertising websites and social media applications on the Internet. The study received ethical approval after a two-step ethical clearance process.

To gather content about this newer tactic, a comprehensive literature search was conducted, followed by an iterative cycle of deductive and inductive coding and analysis of the literature using Atlas.ti (Version 22) [110]. Four organizations that employ technology-based methods with a specific focus on efforts targeting consumer-level demand that fosters sex trafficking were identified. Available open-source data was then consulted and informed the first draft of an organizational profile for each entity that described their approaches to demand reduction and the use of technology. All four of the organizations agreed to participate in the research. What followed was an iterative cycle of conversations, information exchange, and an experience-led write-up of how they employ technology-based demand reduction tactics. This was complemented by a practitioner-led approach to data collection by engaging with those in the broader law enforcement arena for insights into law enforcement tactics like reverse stings and its overlap with technology-based demand reduction tactics.

The two organizations discussed here, Street Grace and The EPIK Project, actively participated during the entire lifecycle of the research project and were able to provide novel insights into the collaboration of humans, humaneness, and technology in their demand deterrence initiatives. An organizationally based case study approach [111] and pathways to rigor [112] in case study research informed the write-up and discussion concerning the use of technology-based deterrence methods used by Street Grace and The EPIK Project. The cases are presented as illustrations [44] that provide practical insights into how humans and technology augment each other's strengths in collaborative efforts to deter consumer-level demand that fosters sex trafficking in online sexual exploitation marketplaces. Lessons can therefore be gleaned for applications to other empirical settings.

6. Case Studies

6.1. Street Grace and Transaction Intercept

Street Grace, a nonprofit, was founded in 2009. Based in Atlanta, Georgia, Street Grace has offices in Chattanooga, Tennessee, and in Houston, Texas, and provides help to several areas in the United States. Transaction Intercept [98], an initiative of Street Grace, seeks to identify individuals seeking to purchase sexual access to minors and strip away their cloak of anonymity. According to Jamey Caruthers[4], Director of Demand Reduction and Policy, using technology to reduce the demand within the online commercial sexual exploitation marketplace is, in Street Grace's view, "the most effective, scalable counter-demand tactic in the fight against minor sexual exploitation".

When potential buyers are identified by having contacted a decoy ad placed by Street Grace, the organization connects with these individuals through "Gracie"—an artificial intelligence chatbot—who communicates the risks and consequences of the potential buyer's actions when the intent to purchase a minor is confirmed by Gracie. Gracie was launched manually (without AI) in 2015 and subsequently launched as an AI chatbot in 2018. A collaborative effort led to the relaunch of Gracie in 2021 after law enforcement input. Transaction Intercept, an enhanced version of Gracie's platform available only to law enforcement, was established as the outcome of this collaboration.

Since mid-2022, Transaction Intercept and Gracie work as fully automated technology platforms. Human behavior is mimicked by Gracie in an SMS (text messaging) environment. Gracie is not merely a chatbot, but also a collection of technologies that operate in tandem to automate the demand reduction process. This automatization removes the cumbersome efforts of conventional human efforts to monitor ads, respond to incoming messages, document outcomes, and interpret the data. Several technologies are intrinsic to this process and make up an ever scaling and artificially intelligent chatbot that actually learns.

Ads are placed and maintained across the online prostitution marketplace where Gracie is employed and "she" intercepts conversations by harnessing SMS technology. Gracie utilizes 112 distinct adolescent personas, interprets these conversations, and then

responds in a typical human manner that includes "convincing slang and SMS lingo". Conversations and the phone numbers of engaged buyers are logged in a database and, upon confirmation of an appointment for a paid sexual exchange, Gracie sends out a deterrence message to warn the buyer of the malfeasance being documented and the potential consequences of the putative buyer's actions. A follow-up message is sent that offers resources to the buyer and the number of clicks to those resources is tracked. All actions are methodically captured and displayed by Gracie on a dashboard. The data is made available to law enforcement and relevant role-players and geared towards helping to end the sexual exploitation of both children and adults online. The value of Gracie is summarized by Jamie Caruthers as follows:

> "Every conversation that a would-be sex buyer has with Gracie is a conversation that he/she isn't having with a real minor, and some of the conversations will result in a buyer being brought to justice".

Street Grace, according to Caruthers, has constructed a "custom dashboard from the ground up to maintain all of the data" and to fuse the "powerful stack of technologies" used by Gracie. The dashboard is constantly kept up-to-date, and cloud-based data storage services are utilized that enable the storage of all buyer interactions with Gracie. A special communications platform is used for SMS communications that has the capacity to link local phone numbers to the Gracie tech stack. NodeJS, a leading programming language for next-generation web projects, is used to code the conversations, and Google is used for Natural Language Processing (NLP). NLP allows Street Grace to elucidate all incoming messages from sex buyers and determine the meaning of the messages. Street Grace describes [113] the power of Google's NLP:

> "Google's NLP is constantly learning, using data from Google web and voice search. These technologies make for a human-like bot that can handle boundless conversations in real time".

Transaction Intercept "enables law enforcement to monitor an exponentially greater number of conversations with potential purchasers of minors", says Jamie Caruthers. This capacity far exceeds what would be possible if unaided by the technology, and law enforcement can "step in" and take control of a given exchange once they identify a buyer who shows interest in a child. This enables law enforcement to initiate a criminal case, which may result in a physical meet-up between law enforcement officials and a prospective child sexual exploitation perpetrator or trafficker.

Challenges that the Street Grace team continue to navigate include getting ads onto and keeping ads on sites frequented by buyers. Many sites, albeit for liability reasons, actively monitor the ads and, in doing so, they put security measures in place in an effort to keep minors off their platforms. Verification sometimes includes a picture of the person in the ad holding their state-issued ID document, or a request for an actual copy of their state-issued ID document. Despite this challenge, Transaction Intercept is currently being enhanced with several new add-ons and features to further improve its use as a counter-demand tool that minimizes the expenditure of law enforcement resources and maximizes reach and impact.

In a 5-month period, Gracie has reached:

- 25 States and 78 Cities.
- over 1000 intercepts a month.
- More than 54,000 messages exchanged.
- More than 6000 would-be predators reported.

Gracie also offers trauma and therapy resources to individual sex buyers to assist them in taking the first step toward receiving help.

Early on, Street Grace made the strategic decision to remain focused on the use of technology to increase the number of successful arrests and prosecutions of buyers rather than on identity disclosure tactics. Gracie's conversations and the phone numbers she obtains are only made available to law enforcement agencies, and there are no other entities

that have access to this data. This phone and conversation data can be used effectively by law enforcement agencies for a variety of purposes, including identifying when sex buyers emerge in overlapping law enforcement systems and interventions (i.e., traffic stops, other sex offences, crimes, or misdemeanors). There are instances where the same phone number could be logged five times, and law enforcement would be most interested in ascertaining who these callers are.

An ethical consideration navigated by the Street Grace team is the use of photographs for ads that are posted on prostitution advertising websites. Street Grace only uses photos from adult volunteers that are digitally altered to such an extent that the volunteer cannot be identified. The comprehensive tech stack and tools used by Street Grace enabled the in-house development of Gracie's AI component. Street Grace calls upon outside sources for technical and development expertise (including programming knowledge). This includes for-profit professionals volunteering their services. After beta-testing with a number of different law enforcement agencies, Street Grace is in the process of continuing to raise funds to enable Transaction Intercept to be used nationally with no subscription fees, dues, or costs to law enforcement (outside of incidental costs such as ad purchases). Currently, Transaction Intercept is available to any jurisdiction or agency that wants to use it.

6.2. The EPIK Project

Based in the Portland/Vancouver area, the EPIK Project [114] (hereafter EPIK) was founded in 2012 in response to sex trafficking in the United States. It actively utilizes technology to disrupt paid sex at the point of sale. Tom Perez[5], Founder and CEO of EPIK, says the organization was prompted by the concern about how technology was used to sexually exploit people and asked the question: "How can we use the same technology being used to exploit people to fight the demand fueling that exploitation?"

In the early days of online prostitution platforms, sites like Backpage were an open marketplace for prostitution and anybody looking for anything related to paying for sexual access would start there. The evolution of EPIK started with a burner phone and a donated laptop. EPIK posted ads without pictures on Backpage and it was clear that getting a response from buyers was not a challenge. The "phone blew up and we were furiously writing numbers down on a writing pad, but we just couldn't keep up", says Perez.

During its first three years of operations, EPIK became part of the CEASE Network (Cities Empowered Against Sexual Exploitation), a project that was launched by Demand Abolition[6] in 2014. As part of this project, Demand Abolition provided financial and technical assistance to cities that were developing local demand-reduction strategies, tactics, and partnerships. Twelve cities participated in the initiative that focused on reducing the demand for illicit sex and holding buyers accountable across the United States.

EPIK's technology platform utilizes custom-built commercial grade call center software and market leading database tools, and it leverages machine learning to continually optimize the impact of volunteer efforts. EPIK's program functions as a "highly trained and sophisticated neighborhood watch program" by providing law enforcement with specific information related to the illegal activity of prostitution and sex trafficking. "There is a well-established flow (and boundaries) of technical intelligence from EPIK to law enforcement" that is credited by Tom Perez to "keeping the boundary clear between Agents of law enforcement and us as Allies".

EPIK also seeks to mobilize male allies to disrupt the illicit sex markets by equipping them to confront the roots of exploitation—male buyers—and encouraging them to effectively collaborate within the broader anti-sex trafficking movement. Sex buyers are connected via text and phone at the attempted point of purchase with 1 of nearly 200 active male volunteers who seek to educate them about the harms of the sex trade while also helping buyers to discover why they are seeking to buy sex acts. EPIK's male volunteers have had tens of thousands of calls and texts with buyers, eliciting a broad range of responses. EPIK volunteers are trained to avoid the use of shaming language.

More than 300 men have been trained to disrupt the demand for sexual exploitation in 21 U.S. cities, and these teams conduct "Cyber Patrols" over 20 nights per month. The training sets the foundation of the long game of Demand Reduction and is rooted in the leadership of the Survivor community. While no formal technical qualifications are needed to serve as an EPIK volunteer, they undergo a vetting process that involves passing a criminal background check and a sex addiction screening test. EPIK has had interested volunteers disqualify themselves from the role saying they were not ready. It is made very clear to volunteers that they are not "going after" buyers as they have no legal authority to do so. Instead, they are trained to provide an offramp to perpetuating the sex trade. Thus, the relationship with law enforcement is such that EPIK works to help buyers who are ready to stop buying, while those in authority handle buyers who are not ready to change.

EPIK recognizes the power of automation but sees technology as a way to help scale what humans can do. Justin Euteneier[7], Program Director and the architect of Cyber Patrols, said: "trafficking cannot end until demand ends. And demand cannot end by technology alone. Humans change culture". EPIK leverages technology to scale that improves the way engagement with buyers take place. They endeavor to find "the sweet spot of using both technology and humans to engage with sex buyers", states Euteneier. This has proven to be very efficient when engaging men. As Tom Perez points out: "We have identified roughly 125,000 active sex buyers through our work. We know that a significant number of these guys might be open to further dialogue . . . We've learned a lot about how to talk to guys about these issues".

After nearly a decade of direct buyer engagement, EPIK has realized the need for proactive outreach to sex buyers and it is here that technology plays a substantial role. By leveraging technologies such as AI and NLP, EPIK focuses its efforts on those men more open to change and to continual learning. Thus, EPIK takes into account research that indicates that many active sex buyers would like to stop [115]. The organization combines the power of technology and volunteers trained to use non-shaming tactics and uses their copious opportunities to help active buyers become former buyers.

As for buyer accountability, EPIK is playing the long game. Buyers' behavior is never excused and the harm they cause is never minimized. However, instead of focusing on the singular act on a given night, volunteers are trained to invite buyers into the bigger picture of what they are doing. "Shaming language is replaced with questions. Questions open doors. Open doors lead to discoveries. Discoveries lead to change", stated Euteneier. He continued: "We talk about leaving the baseball bat at the door. That is also why we talk about technology and the human connection. This method has allowed us to make real connections with buyers for a significant impact".

Calls as long as an hour are not uncommon with buyers trying to make sense of their actions. To date, the EPIK Project has logged over 250,000 attempts by an estimated 125,000 men intent on buying sexual access to another person. These interruptions have led to tens of thousands of meaningful conversations. EPIK enjoys support from survivors, advocates, and city officials and is recognized as a leader in demand reduction efforts. A contributing factor to the EPIK Project's success is its collaboration with law enforcement agencies. "We want to be allies to law enforcement, not agents" and "we want to make sure to draw that line", asserts Perez.

EPIK has three ways of collaborating with law enforcement. First, law enforcement agencies are offered information about local buyer activity. This includes phone numbers and any relevant information that could be useful to them. For instance, in the first few years of its operation, EPIK was encountering the same buyers that were repeatedly engaging with ads. Upon realizing these were high frequency buyers, EPIK shared this information with law enforcement. This helped law enforcement to use their resources more efficiently when conducting their own buyer operations. Having the numbers of known active buyers provides insight when decisions are made about which buyers to pursue. Second, law enforcement may invite EPIK to do undercover operations with them. This includes having trained and vetted EPIK volunteers engaging with actual buyers

who are arrested following their processing. After the arrested buyers are processed by police, they are given the option to speak to the volunteers from EPIK. Many of those arrested agree to engage in a conversation even though they are free to go. Third, EPIK also participates in sex buyer diversion programs in some cities.

The technology stack used by EPIK can be summarized as follows:

- Web-based call center software. This requires minimal tech savviness and anyone with basic technology skills can answer calls and texts and start engaging buyers.
- Database management tools. This is used to keep track of all buyer activity, which allows for larger scale data analysis.
- Machine Learning and Natural Language Processing. This allows for deep analysis of effective and/or ineffective communications and improved training.
- Artificial Intelligence: Machine Learning and Natural Language Processing is leveraged to build tools that will optimize volunteer effort and buyer engagements.

According to Tom Perez, "the sexual exploitation ecosystem has changed substantially in recent years. There is no longer anything subtle about the commercial sex marketplace—it is in your face". Not only has the ecosystem radically changed, but it is diffused into apps and numerous other subsystems. Ethical decision-making is a constant consideration. EPIK takes its cues from the wisdom and leadership of people with lived experience in systems of prostitution. Working to end demand requires tact and thoughtfulness about how people are impacted: buyers, survivors, volunteers, everyone. Collaboration is a significant value at EPIK.

6.3. Technology, Ethics, and Data Security

Sophisticated technological tools, increasingly forming part of government, civil society, and private sector responses to human trafficking, have not been absolved from scrutiny [116,117]. Data privacy, ethics, transparency, accountability, and informed consent are therefore some of the issues that have come into focus as increasing reliance is placed on technology. Some form of collecting, storing, sharing, and analysis of data is inevitable and each of these comes with its own inherent risks that mandates protocols and protections. No comprehensive list of measures for data protection, ethics and informed consent are in existence when developing technological solutions to help combat human trafficking, but several basic aspects need to be addressed by technology companies and NGOs [38–40]. In addition to the well-established and sophisticated technologies used by Street Grace and EPIK, both organizations have iterative processes that consider risks, ethics, data storage, and privacy. These processes and the functionalities of chatbots are managed with comprehensive human guidance and oversight. Clear parameters are in place for AI operability. Here, the importance of collaboration is again underscored in the real-world experiences of survivor leaders and technical knowledge from the broader technology industry, which is invited and continually woven into strategies and operations. Data collection by the organizations focus solely on buyer interactions with chatbots, and analysis is conducted on conversations. Chatbots take affirmative actions in response to prompts by buyers and are trained only on a databank of solicitation conversations that bears the basic tenets of illegal conduct in terms of prostitution and/or sex trafficking laws. Unless shared with law enforcement agencies, all information is deidentified and securely stored. Data reserves are entirely protected and not shared with outsiders. Deterrence at the point of purchase is the nucleus of the tactics employed by Street Grace and EPIK, and meaningful conversations—not shaming—are embraced. In summary, both organizations follow established best practices proposed for technology use in human trafficking combating efforts [38–40] and accord these practices with five ethical principles that have been identified from the global corpus of principles and guidelines on ethical AI: transparency, justice and fairness, non-maleficence, responsibility, and privacy [41].

7. Discussion

The confluence of complexities intrinsic to the ever-expanding capabilities of technology and the online environment continues to eclipse operational responses by law enforcement agencies when dealing with technology-facilitated crime [118]. Conversely, technological tools have the ability to scale and catalyze the work that law enforcement is already doing and can provide macro-level intelligence about the commercial sex market. Embracing and optimally using available technology tools to discourage the demand that fosters sex trafficking and the online sexual exploitation marketplace is no longer optional. Parents, families, communities, law enforcement agencies, and corporations across the globe are all concerned and affected, directly and indirectly, by the sexual exploitation of adults and children. Similar to what has been pointed out [119] in the context of available police technologies, citizens and society at large know that these technology tools exist and expect law enforcement agencies and leaders to employ them in their efforts to protect people and create safer communities—both online and offline.

Available technologies provide an automated means of (1) scanning online communications and advertising, (2) identifying instances of illicit transactions, and (3) identifying individual buyers who have responded to online ads or social media messages. They also engage buyers in some form of interaction designed to deter individuals from attempting to purchase sexual access at the present "point of purchase" moment as well as in the future. They can operate in fully automated mode and can be deployed at all times. Bots are programmed to identify communications indicative of commercial sex or sex trafficking and obtain contact information based on the accounts used by buyers via voice, text, email, or chat function to initiate a commercial sex transaction. Through extensive testing, development, and live deployment, artificial intelligence supports the evolution of the automated messaging that is pushed out to buyers so that the language used, pacing, and local dialects become tailored to appear authentic rather than computer-generated. These and other capabilities allow the constant deployment of the technology to gather rich data about patterns in local illicit markets and have the capacity to identify activity consistent with attempts to purchase sex. Automated scanning and identification, coupled with realistic automated responses to buyers, thus provides the only feasible means of constantly (rather than periodically) attempting to undercut markets for sexual exploitation by dissuading buyers at points of purchase. In addition to cost effectiveness and scalability in addressing demand, the technologies also appeal to law enforcement agencies and anti-sex trafficking organizations by providing methods for addressing the supply and distribution components of local markets. The constant scanning and analytic capabilities of these technologies also identify likely cases of child sex trafficking and other exploitation and have successfully aided law enforcement agencies in identifying victims, as well as identifying sex traffickers and sex trafficking networks.

As found in this research, collaboration through augmented intelligence is central to the efforts by Street Grace and EPIK to discourage the demand that fosters sex trafficking. Their operational postures are characterized by the following: (1) system-wide collaboration on all aspects of technology, development, and innovation, (2) collaboration with law enforcement and other partners in the counter-human trafficking arena, and (3) relational collaboration with the survivor community. Both organizations seek the council and involvement of survivors in all aspects of their operations, which informs organizational strategy and machine learning aspects of the technology they use. A relationship of trust with law enforcement agencies is credited as being at the nucleus of their tactical and strategic success. Both Street Grace's and EPIK's approach feature a consistent use of human labor where technology identifies people actively seeking to purchase sex, and then trained volunteers step in to provide deterrence messages. As highlighted by EPIK's Justin Euteneier: "An over dependence on technology undermines the story we tell victims and survivors; that they are valued. If so, then they are worthy of our time, not just our capacity to create technology". Technology is not the panacea for ending consumer-level demand or eradicating the online commercial sexual exploitation infrastructure. Ending demand

"requires humans who will change cultural norms that make sexual exploitation so easy and accepted", said Euteneier.

From a complex systems [46,120] perspective, the ability of augmented intelligence to amplify the "density, intensity, and quality" [46] (p. 772) of collaborative connections allows for an agile retort that looks remarkably similar to the complex systems that fuel the demand for sex trafficking and perpetrates it. The manifold uncertainties and blind spots that emanate from the external environment require not only managers and strategists but also frontline actors like law enforcement officers, prosecutors, and multidisciplinary practitioners to embrace peripheral visioning as "a way of knowing". Peripheral visioning enables actors to "*identify opportunities and threats emerging from far beyond the theoretical boundary*" [121] (p. 80) of an organization or response agency. Augmented intelligence supports peripheral visioning and the iterative probing of events in the external environment to "examine their potential implications on future competitiveness" [121] (p. 80). Furthermore, augmented intelligence fits well into the "3P" paradigm [122]—prosecution, protection, and prevention—that continues to serve as the global framework used to combat human trafficking. It allows for *prosecutorial* enhancements through court-driven digital evidence collection, the *protection* of adults and children in harm's way, and systemic *prevention* by disrupting consumer-level demand at the point of purchase, while offering services that inhibit predatory behavior. *Partnerships* and *participation* can be strengthened by augmented intelligence and contribute to a more holistic '3P+2' paradigm [57,58] for counter-trafficking efforts in general. Technology permits these endeavors to be scaled and geared for impact monitoring and evaluation.

Finally, technology-facilitated trafficking requires certitude related to legislative action by the government and the establishment of industry standards, the harmonization of approaches, and the support of enforcement initiatives. Policymakers should therefore garner insights from non-State initiatives by organizations like Street Grace and EPIK to learn from their innovative approaches to demand reduction while gleaning insights into "how different sectors can be impacted by future policy development at the State level" [123] (p. 4).

8. Conclusions

The spectrum of available and developing technologies are expanding and are here to stay, while human(e) faculties, creativity, and connectedness are, equally, not in short supply. As the fusion of these genii, augmented intelligence is poised to play a significant role in the ongoing battle to disrupt online sex trafficking-related criminality and prevent its physical, psychological, and sexual scarring in the offline environment. The 2022 World Day Against Trafficking theme's focus [124] on the role of technology as a tool that can impede human trafficking and the restated resolve [4] by the United Nations to multilevel strategies aimed at discouraging the demand that fosters trafficking for sexual exploitation both serve as call to actions that are backed by an established international legal framework. The Street Grace and EPIK cases discussed here provide promising insights for operational scaling, and a template for consideration by law enforcement agencies, criminal justice systems, and the larger multidisciplinary counter-trafficking community of their vantage point and their collaborative role in the future of augmented intelligence efforts to discourage the demand that fosters trafficking for sexual exploitation. From an innovative non-State perspective, the cases respond to the call by UN Secretary-General António Guterres for governments, regulators, businesses and civil society to collaborate by investing in "policies, laws and technology-based solutions that can identify and support victims, locate and punish perpetrators, and ensure a safe, open and secure internet for all" [43]. Winsome collaboration between law enforcement, the technology industry, and anti-trafficking stakeholders are taking place, and granular considerations for capacity building in areas of Internet monitoring and undercover online investigations as possible responses to sex trafficking [42] are available for implementation. Augmented intelligence

is already flourishing and primed for further expansion in efforts to discourage the demand that fosters sex trafficking.

Institutional Review Board Statement: The study received ethical approval after a two-step ethical clearance process. Advarra, a company which provides IRB services, is fully accredited by the Association for the Accreditation of Human Research Protection Programs, Inc. Advarra found, "Using the Department of Justice (DOJ) regulations 28 CFR 46, the IRB determined that your research project does not meet the DOJ definition of human subjects research under 28 CFR 46 and, therefore, does not require IRB oversight." DOJ's National Institute of Justice concurred with this finding.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data collected and relevant insights from more than 2650 cities and counties in the U.S. can be accessed at Demand Forum: https://demand-forum.org (accessed on 20 March 2023).

Conflicts of Interest: The author declares no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

Notes

[1]   A presentation entitled '*A.I. et al: Sailing the Internet's Oceans to Deter Sex Buyers*,' was an outcome of this research project and delivered by the author during the American Society of Criminology's (ASC) annual meeting, during November 16-19, 2022 in Atlanta, Georgia.

[2]   A website called 'Streamate' was implicated by one respondent in the 2018 study by Thorn. It could not be confirmed whether this is the same website implicated in the South African child sex trafficking case (State v Seleso).

[3]   The author provided expert court testimony in the South African case (State v Seleso). Case References (South Africa): Westonaria Police CAS 150/10/2017 and Johannesburg High Court Case no 41/2017.

[4]   The initial discussion with Jamie Caruthers, Director, Demand Reduction and Policy, at Street Grace took place on February 25, 2022. Multiple follow-up calls and email conversations took place during which the Street Grace case study was refined and finalized.

[5]   The initial discussion with Tom Perez, Founder and CEO, of EPIK took place on 17 June 2022. Multiple follow-up calls and email conversations took place during which the EPIK case study was refined and finalized.

[6]   Demand Abolition was established in 2008 by Ambassador Swanee Hunt through the Hunt Alternatives Fund to stop sex trafficking in the US by combatting the purchase of adults and children in prostitution. In 2020, the foundation decided to embed Demand Abolition in a like-minded organization with long-term sustainability. In 2022, the National Center on Sexual Exploitation absorbed the archives and active projects of "Demand Abolition."

[7]   The initial discussion with Justin Euteneier, Program Director, of EPIK, took place on 17 August 2022. Multiple follow-up calls and email conversations took place during which the EPIK case study was refined and finalized.

References

1.   United Nations. *Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially Women and Children, Supplementing the United Nations Convention Against Transnational Organized Crime. General Assembly Resolution 55/25 of 15 November 2000*; United Nations: Vienna, Austria, 2000. Available online: https://www.ohchr.org/en/instruments-mechanisms/instruments/protocol-prevent-suppress-and-punish-trafficking-persons (accessed on 23 January 2023).

2.   OSCE. Ministerial Council Decision No. 6/17 Strengthening Efforts to Prevent Trafficking in Human Beings, MC.DEC/6/17, 2017, Hamburg. Available online: https://www.osce.org/files/f/documents/4/0/362096.pdf (accessed on 23 January 2023).

3.   OSCE. Ministerial Council Decision No. 2/03 Combating Trafficking in Human Beings, 2003, Maastricht. Available online: https://www.osce.org/files/f/documents/1/4/40379.pdf (accessed on 23 January 2023).

4. United Nations. *Resolution 77/194: Trafficking in Women and Girls. Resolution Adopted by the General Assembly on 15 December 2022, Seventy-Seventh Session*. 2022. Available online: https://www.undocs.org/Home/Mobile?FinalSymbol=A%2FRES%2F77%2F194&Language=E&DeviceType=Desktop&LangRequested=False (accessed on 1 February 2023).

5. Shively, M.; Jalbert, S.K.; Kling, R.; Rhodes, W.; Finn, R.; Flyage, C.; Tierney, L.; Hunt, D.; Squires, D.; Dyos, C.; et al. *Final Report on the Evaluation of the First Offender Prostitution Program*; Abt Associates Inc.: Cambridge, MA, USA, 2008. Available online: https://www.ojp.gov/pdffiles1/nij/grants/221894.pdf (accessed on 2 February 2023).

6. Venkatesh, S. *How Tech Tools Transformed New York's Sex Trade*; Wired: Boone, IA, USA, 2011. Available online: https://transmarcations.constantvzw.org/texts/Peggy_sexworkers.pdf (accessed on 2 February 2023).

7. Booth, M. *Craigslist Develops a Dark Side*; The Denver Post: Denver, CO, USA, 2007. Available online: https://www.denverpost.com/2007/12/03/craigslist-develops-a-dark-side (accessed on 2 February 2023).

8. Anton, L.L. *'Escorts' Leave the Streets to Get on the Superhighway*; Tampa Bay Times: Saint Petersburg, FL, USA, 2006. Available online: https://www.tampabay.com/archive/2006/07/02/escorts-leave-the-streets-to-get-on-the-superhighway (accessed on 2 February 2023).

9. Roane, K.R. *Prostitutes on Wane in New York Streets But Take to Internet*; The New York Times: New York, NY, USA, 1998. Available online: https://www.nytimes.com/1998/02/23/nyregion/prostitutes-on-wane-in-new-york-streets-but-take-to-internet.html (accessed on 2 February 2023).

10. Sanders, J.Q. *Prostitution Hits Web in State*; Arkansas Democrat Gazette: Little Rock, AR, USA, 2008. Available online: https://www.arkansasonline.com/news/2008/feb/10/prostitution-hits-web-state-20080210 (accessed on 2 February 2023).

11. Baker, L. The Information Needs of Female Police Officers Involved in Undercover Prostitution Work, Information Research 10, no. 1 (2004). Available online: http://informationr.net/ir/10-1/paper209.html (accessed on 15 December 2022).

12. Hay, B. Sting Operations, Undercover Agents, and Entrapment. *Mo. Law Rev.* **2005**, *70*, 387. Available online: https://scholarship.law.missouri.edu/mlr/vol70/iss2/2/ (accessed on 15 December 2022).

13. Long, G. How to Plan a 'John' Sting. *Police Magazine, Women in Law Enforcement*, 18 April 2012. Available online: https://www.policemag.com/374063/how-to-plan-a-john-sting(accessed on 15 December 2022).

14. Long, G. How to Stay Safe during a John Sting, Women in Law Enforcement. *Police Magazine*, 2 July 2012. Available online: https://www.policemag.com/374107/how-to-stay-safe-during-a-john-sting(accessed on 15 December 2022).

15. Newman, G.R.; Socia, K. *Sting Operations, Problem-Oriented Guides for Police, Response Guides Series No. 6*; U.S. Department of Justice Office of Community Oriented Policing Services: Washington, DC, USA, 2007. Available online: https://cops.usdoj.gov/ric/Publications/cops-p134-pub.pdf (accessed on 15 December 2022).

16. Thomas, A.; Paternoster, R.L.; Weiss, D.B. Chapter 4: Deterrence. In *The Handbook of Criminological Theory*; Piquero, A.R., Ed.; John Wiley & Sons, Inc.: Hoboken, NJ, USA, 2016; pp. 50–74. [CrossRef]

17. Paternoster, R. Chapter 3: Perceptual Deterrence Theory. In *Deterrence, Choice, and Crime, Volume 23*; Nagin, D.S., Cullen, F.T., Jonson, C.L., Eds.; Routledge, Taylor & Francis: New York, NY, USA, 2018; pp. 81–106. [CrossRef]

18. Apel, R.; Nagin, D.S. Chapter 7: Perceptual Deterrence. In *The Oxford Handbook of Offender Decision Making*; Bernasco, W., van Gelder, J.-L., Elffers, H., Eds.; Oxford University Press: New York, NY, USA, 2017; pp. 121–140.

19. Apel, R.; Nagin, D.S. Chapter 14: General Deterrence: A Review of Recent Evidence. In *Crime and Public Policy*; Wilson, J.Q., Petersilia, J., Eds.; Oxford University Press: New York, NY, USA, 2011; pp. 411–436.

20. Braga, A.A.; Weisburd, D.L. The Effects of Focused Deterrence Strategies on Crime: A Systematic Review and Meta-analysis of the Empirical Evidence. *J. Res. Crime Delinq.* **2012**, *49*, 323–358. [CrossRef]

21. Demand Forum. An Overview of Prostitution and Solicitation Laws in the United States, Demand Forum. Available online: https://demand-forum.org/wp-content/uploads/2022/06/USA_Overview-of-Prostitution-and-Solicitation-Laws-in-the-United-States.pdf, (accessed on 15 March 2023).

22. National Conference of State Legislatures. Human Trafficking State Laws, National Conference of State Legislatures. 2020. Available online: https://www.ncsl.org/civil-and-criminal-justice/human-trafficking-state-laws (accessed on 20 March 2023).

23. United States of America: Victims of Trafficking and Violence Protection Act of 2000 [United States of America], Public Law 106-386 [H.R. 3244], 28 October 2000. Available online: https://www.refworld.org/docid/3ae6b6104.html (accessed on 15 March 2023).

24. De Vries, I.; Reid, J.A.; Farrell, A. From Responding to Uncertainties and Ambiguities to More Constructive and Inclusive Debates on Commercial Sex and Sex Trafficking. *Vict. Offenders* **2023**, *18*, 586–606. [CrossRef]

25. Raphael, J. Returning trafficking prevalence to the public policy debate: Introduction to the special issue. *J. Hum. Traffick.* **2017**, *3*, 1–20. [CrossRef]

26. Feifer, K.; Raphael, J.; Yagci Sokat, K. Do prostitution advertisements reduce violence against women? A methodological examination of Cunningham, DeAngelo, and Tripp findings. *Dign. A J. Anal. Exploit. Violence* **2019**, *4*, 7.

27. Lachapelle, L.; Schneider, C.; Shapiro, M.; Hughes, D.M. Does the decriminalization of prostitution reduce rape and sexually transmitted disease? *A review of Cunningham and Shah findings. Dign. A J. Sex. Exploit. Violence* **2019**, *4*, 3.

28. Shapiro, M.; Hughes, D.M. Decriminalized prostitution: Impunity for violence and exploitation. *Wake Forest L. Rev.* **2017**, *52*, 533.

29. Balfour, A.W. Where One Marketplace Closes, (Hopefully) Another Won't Open: In Defense of FOSTA. *Boston Coll. Law Rev.* **2019**, *60*, 2475–2509.

30. Albert, K.; Armbruster, E.; Brundige, E.; Denning, E.; Kim, K.; Lee, L.; Ruff, L.; Simon, K.; Yang, Y. FOSTA in legal context. *Columbia Hum. Rights Law Rev.* **2020**, *52*, 1084–1158. [CrossRef]

31. Zeng, H.S.; Danaher, B.; Smith, M.D. Internet Governance Through Site Shutdowns: The Impact of Shutting Down Two Major Commercial Sex Advertising Sites. *Manag. Sci.* **2022**, *68*, 8234–8248. [CrossRef]

32. United States Government Accountability Office. Sex Trafficking: Online Platforms and Federal Prosecutions, GAO. 2021. Available online: https://www.gao.gov/products/gao-21-385 (accessed on 20 March 2023).

33. Massaro, T.M.; Norton, H. Siriously? Free speech rights and artificial intelligence. *Northwest. Univ. Law Rev.* **2015**, *110*, 1169–1194.

34. Garvey, J.B. Let's Get Real: Weak Artificial Intelligence Has Free Speech Rights. *Law Rev.* **2022**, *91*, 953.

35. Etzioni, A.; Etzioni, O. Incorporating ethics into artificial intelligence. *J. Ethics* **2017**, *21*, 403–418. [CrossRef]

36. Carrillo, M.R. Artificial intelligence: From ethics to law. *Telecommun. Policy* **2020**, *44*, 101937. [CrossRef]

37. Ashok, M.; Madan, R.; Joha, A.; Sivarajah, U. Ethical framework for Artificial Intelligence and Digital technologies. *Int. J. Inf. Manag.* **2022**, *62*, 102433. [CrossRef]

38. Inter-Agency Coordination Group Against Trafficking in Persons. *Human Trafficking and Technology: Trends, Challenges and Opportunities*; Inter-Agency Coordination Group Against Trafficking in Persons: Vienna, Austria, 2019.

39. Group of Experts on Action Against Trafficking in Human Beings. *Online and Technology-Facilitated Trafficking in Human Beings*; Inter-Agency Coordination Group Against Trafficking in Persons, 2022. Available online: https://rm.coe.int/online-and-technology-facilitated-trafficking-in-human-beings-full-rep/1680a73e49 (accessed on 20 December 2022).

40. Office of the Special Representative and Co-Ordinator for Combating Trafficking in Human Beings and Tech against Trafficking. *Leveraging Innovation to Fight Trafficking in Human Beings: A Comprehensive Analysis of Technology Tools*; Office of the Special Representative and Co-Ordinator for Combating Trafficking in Human Beings and Tech against Trafficking: Vienna, Austria, 2020.

41. Jobin, A.; Ienca, M.; Vayena, E. The global landscape of AI ethics guidelines. *Nat. Mach. Intell.* **2019**, *1*, 389–399.

42. UNODC. *Global Report on Trafficking in Persons 2022*; United Nations: New York, NY, USA, 2022. Available online: https://www.unodc.org/documents/data-and-analysis/glotip/2022/GLOTiP_2022_web.pdf (accessed on 3 March 2023).

43. Guterres, A. Message on World Day Against Trafficking in Persons. UN Secretary-General António Guterres. 30 July 2022. Available online: https://www.unodc.org/unodc/en/endht/sgs-message-on-world-day-against-trafficking-in-persons.html (accessed on 3 March 2023).

44. Siggelkow, N. Persuasion with case studies. *Acad. Manag. J.* **2007**, *50*, 20–24. [CrossRef]

45. Williams, P. Combating human trafficking: Improving governance institutions, mechanisms and strategies. *Strateg. Against Hum. Traffick. Role Secur. Sect.* **2009**, 381–425. Available online: https://www.dcaf.ch/strategies-against-human-trafficking-role-security-sector (accessed on 20 March 2023).

46. Van der Watt, M. A complex systems stratagem to combating human trafficking. In *The Palgrave International Handbook on Human Trafficking*; Winterdyk, J., Jones, J., Eds.; Palgrave Macmillan: New York, NY, USA, 2020. [CrossRef]

47. Foot, K. *Collaborating against Human Trafficking: Cross-Sector Challenges and Practices*; Rowman & Littlefield: Lanham, MD, USA, 2015.

48. Miller, A.; Laser, J.; Alejano-Steele, A.; Napolitano, K.; George, N.; Connot, N.; Finger, A. Lessons Learned from the Colorado Project to Comprehensively Combat Human Trafficking. *Societies* **2023**, *13*, 51. [CrossRef]

49. Jones, T. Perceptions of the benefits and barriers to anti-human trafficking interagency collaboration: An exploratory factor analysis study. *Societies* **2023**, *13*, 38. [CrossRef]

50. Ray, J.P. Conceptualizing Task Force Sustainability. *Societies* **2023**, *13*, 50. [CrossRef]

51. Tolstikov-Mast, Y.; Aghajanian, C. Intersectional Approach to Combatting Human Trafficking: Applying an Interdisciplinary Global Leader-Follower Collaboration Paradigm. In *Handbook of Global Leadership and Followership*; Dhiman, S.K., Marques, J., Schmieder-Ramirez, J., Malakyan, P.G., Eds.; Springer: Berlin/Heidelberg, Germany, 2023; pp. 1–26. Available online: https://link.springer.com/referenceworkentry/10.1007/978-3-030-75831-8_38-1 (accessed on 20 March 2023).

52. Schwarz, C.; Alvord, D.; Daley, D.; Ramaswamy, M.; Rauscher, E.; Britton, H. The trafficking continuum: Service providers' perspectives on vulnerability, exploitation, and trafficking. *Affil. J. Women Soc. Work.* **2019**, *34*, 116–132.

53. Clawson, H.J.; Dutch, N.; Solomon, A.; Grace, L.G. *Human Trafficking into and within the United States: A Review of the Literature*; Office of the Assistant Secretary for Planning and Evaluation, US Department of Human and Heath Services: Washington, DC, USA, 2009. Available online: https://aspe.hhs.gov/sites/default/files/migrated_legacy_files//43241/index.pdf (accessed on 15 March 2023).

54. Lockyer, S. Beyond inclusion: Survivor-leader voice in anti-human trafficking organizations. *J. Hum. Traffick.* **2022**, *8*, 135–156. [CrossRef]

55. The White House. *The National Action Plan to Combat Human Trafficking*; The White House: Washington, DC, USA, 2021. Available online: https://www.whitehouse.gov/wp-content/uploads/2021/12/National-Action-Plan-to-Combat-Human-Trafficking.pdf (accessed on 20 March 2023).

56. Sheldon-Sherman, J.A.L. The missing 'p': Prosecution, prevention, protection, and partnership in the Trafficking Victims Protection Act. *Penn State Law Rev.* **2012**, *117*, 443–501. Available online: https://www.pennstatelawreview.org/print-issues/117-penn-st-l-rev-443-2012/ (accessed on 20 March 2023).

57. Winterdyk, J. Explaining human trafficking: Modern day-slavery. In *The Palgrave International Handbook of Human Trafficking*; Winterdyk, J., Jones, J., Eds.; Palgrave Macmillan: Cham, Switzerland, 2020; pp. 1257–1274.

58. Winterdyk, J.; Van der Watt, M. Epilogue to the Special Issue on Forced Labour. *Arch. Kryminol.* **2021**, *XLIII/1*, 295–306. Available online: https://www.ceeol.com/search/journal-detail?id=799 (accessed on 20 March 2023).

59. Cook County Sheriff's Office. National Sex Buyer Stings Reach 10,000 Arrests. *News Release*, 5 February 2020. Available online: https://www.cookcountysheriff.org/national-sex-buyer-stings-reach-10000-arrests(accessed on 20 March 2023).

60. Cook County Sheriff's Office. National Sex Buyer Sting Nets More than 500 Arrests. *News Release*, 31 July 2019. Available online: https://www.cookcountysheriff.org/national-sex-buyer-sting-nets-more-than-500-arrests(accessed on 20 March 2023).

61. Devlin, H. *Trafficking Industry Hit as 'Sex Worker' Chatbots Fool Thousands*; The Guardian: London, UK, 13 February 2020. Available online: https://www.theguardian.com/society/2020/feb/13/sex-worker-chatbots-fool-thousands-to-hit-trafficking-industry (accessed on 20 March 2023).

62. IBM. *What is Artifical Intelligence?* IBM: New York, NY, USA. Available online: https://www.ibm.com/topics/artificial-intelligence (accessed on 15 March 2023).

63. Brown, J.E.; Halpern, J. Ai Chatbots Cannot Replace Human Interactions in the Pursuit of More Inclusive Mental Healthcare. *SSM-Ment. Health* **2021**, *1*, 100017. [CrossRef]

64. Pasquinelli, M. *Alleys of Your Mind: Augmented Intelligence and Its Traumas*; Meson Press: Lunenburg, NS, Canada; University of Luneburg: Lunenburg, NS, Canada, 2015. Available online: https://library.oapen.org/handle/20.500.12657/37566 (accessed on 20 March 2023).

65. Heidmann, L. What Is Augmented Intelligence? Scaling AI. *Dataiku*, 3 August 2021. Available online: https://blog.dataiku.com/augmented-intelligence(accessed on 20 March 2023).

66. Black, J.; Kurra, G.; Knudsen, E. Augmented intelligence: The new world of surveys at work. *Ind. Organ. Psychol.* **2021**, *14*, 451–459.

67. Latonero, M.; Musto, J.; Boyd, Z.; Boyle, E.; Bissel, A.; Gibson, K.; Kim, J. *The Rise of Mobile and the Diffusion of Technology-Facilitated Trafficking*; Research Series on Technology and Human Trafficking; University of Southern California: Los Angeles, CA, USA, 2012. Available online: https://bpb-us-e1.wpmucdn.com/sites.usc.edu/dist/e/695/files/2012/11/Tech_Trafficking_2012_SUMMARY.pdf (accessed on 1 February 2023).

68. Portman, R.; McCaskill, C. *Backpage.com's Knowing Facilitation of Online Sex Trafficking*; United States Senate Permanent Subcommittee on Investigations: Washington, DC, USA, 2017. Available online: https://www.govinfo.gov/content/pkg/CHRG-115shrg24401/html/CHRG-115shrg24401.htm (accessed on 5 January 2023).

69. Merrit Kennedy, Craigslist Shuts down Personals Section after Congress Passes Bill on Trafficking. NPR, 23 March 2018. Available online: https://www.npr.org/sections/thetwo-way/2018/03/23/596460672/craigslist-shuts-down-personals-section-after-congress-passes-bill-on-traffickin (accessed on 5 January 2023).

70. Alonso, A.; Geran, J.M. *A Baseline Assessment: Data Collection and Analysis of Women Escort Advertisements Posted on Backpage.com in Madison, WI*; UNESCO Working Paper Series 001-02-2020; 4W Initiative, University of Wisconsin-Madison: Madison, WI, USA, 2020. Available online: https://minds.wisconsin.edu/handle/1793/80835?show=full (accessed on 20 March 2023).

71. United States Department of Justice. *Justice Department Leads Effort to Seize Backpage.Com, the Internet's Leading Forum for Prostitution Ads, and Obtains 93-Count Federal Indictment*; Office of Public Affairs: Washington, DC, USA, 2018. Available online: https://www.justice.gov/opa/pr/justice-department-leads-effort-seize-backpagecom-internet-s-leading-forum-prostitution-ads, (accessed on 15 March 2023).

72. Spectre, R. *Beyond Backpage: Buying and Selling Sex in the United States One Year Later*; ChildSafe.ai: Brooklyn, NY, USA, 2019. Available online: https://childsafe.ai/beyond-backpage-buying-and-selling-sex-in-the-united-states-one-year-later (accessed on 15 December 2022).

73. Brooks, M. *It's Hard out There for a Pimp*; ShadowDragon: Cheyenne, WY, USA, 2019. Available online: https://blog.shadowdragon.io/its-hard-out-there-for-a-pimp (accessed on 15 December 2022).

74. Bouché, V. *Survivor Insights: The Role of Technology in Domestic Minor Sex Trafficking*; THORN: Manhattan Beach, CA, USA, 2018. Available online: https://www.thorn.org/wp-content/uploads/2019/12/Thorn_Survivor_Insights_090519.pdf (accessed on 15 December 2022).

75. Mamacos, E. Camming in Suburbia: It's More Common, and More Dangerous, than You Think. W24, 8 November 2018. Available online: https://www.news24.com/w24/Work/Jobs/camming-in-suburbia-its-more-common-and-more-dangerous-than-you-think-20181108 (accessed on 15 December 2022).

76. Schofield, D. Lockdown Sex Workers Are Flocking to Animal crossing and Second Life. Wired, 6 September 2020. Available online: https://www.wired.co.uk/article/video-games-sex-work (accessed on 5 January 2023).

77. Marina, J. Congress to Launch Probe into Escort and Prostitution Services on Twitter. The Street, 30 January 2014. Available online: https://www.thestreet.com/technology/congress-to-launch-probe-into-escort-and-prostitution-services-on-twitter-12277405 (accessed on 5 January 2023).

78. Boyd, D.; Casteel, H.; Thakor, M.; Johnson, R. Human Trafficking and Technology: A Framework for Understanding the Role of Technology in the Commercial Sexual Exploitation of Children in the U.S. Microsoft. 2016. Available online: https://www.microsoft.com/en-us/research/wp-content/uploads/2016/02/en-us-collaboration-focus-education-htframework-2011.pdf (accessed on 5 January 2023).

79. Jiao, S.; Bungay, V.; Jenkins, E. Information and communication technologies in commercial sex work: A double-edged sword for occupational health and safety. *Soc. Sci.* **2021**, *10*, 23. [CrossRef]

80. The Avery Center. Only Fans: A Case Study of Exploitation in the Digital Age. 2021. Available online: https://theaverycenter.org/wp-content/uploads/2021/12/OnlyFans-A-Case-Study-of-Exploitation-in-the-Digital-Age-1.pdf (accessed on 23 January 2023).

81. Murphy, A.K.; Venkatesh, S.A. Vice Careers: The Changing Contours of Sex Work in New York City. *Qual. Sociol.* **2006**, *29*, 129–154. [CrossRef]

82. Daggett, M.P.; Waugh, F.R.; Davison Reynolds, H.J.; Engholm, C.D.; Sloboda, J.A.; Heine, C.E. *The Human Trafficking Technology Roadmap: A Targeted Development Strategy for the Department of Homeland Security*; Massachusetts Institute of Technology (Lincoln Laboratory): Cambridge, MA, USA, 2019. Available online: https://www.ll.mit.edu/sites/default/files/publication/doc/2021-04/human-trafficking-technology-roadmap-daggett-127172.pdf (accessed on 20 March 2023).

83. Campana, P. Online and Technology-Facilitated Trafficking in Human Beings. Group of Experts on Action against Trafficking in Human Beings. 2022. Available online: https://rm.coe.int/online-and-technology-facilitated-trafficking-in-human-beings-summary-/1680a5e10c (accessed on 12 January 2023).

84. OSCE; ODIHR; U.N. Women. Guidance: Addressing Emerging Human Trafficking Trends and Consequences of the COVID-19 Pandemic. OSCE, ODIHR, UN Women. 2020. Available online: https://www.osce.org/files/f/documents/2/a/458434_4.pdf (accessed on 1 February 2023).

85. Keskin, B.B.; Bott, G.J.; Freeman, N.K. Cracking Sex Trafficking: Data Analysis, Pattern Recognition, and Path Prediction. *Prod. Oper. Manag.* **2020**, *30*, 1110–1135. [CrossRef]

86. Roe-Sepowitz, D. A Six-Year Analysis of Sex Traffickers of Minors: Exploring Characteristics and Sex Trafficking Patterns. *J. Hum. Behav. Soc. Environ.* **2019**, *29*, 608–629. [CrossRef]

87. Naidoo, S. Mother, daughter human traffickers to be sentenced. *SABC News*, 4 December 2019. Available online: https://www.sabcnews.com/sabcnews/mother-daughter-human-traffickers-to-be-sentenced/(accessed on 27 March 2023).

88. Van der Watt, M. *Research into the Nature and Scope of Trafficking in Persons in South Africa: Prevalence Insights from the Criminal Justice System and Relevant Reporting Mechanisms*; United States Agency International Development (USAID): Washington, DC, USA, 2022. Available online: https://pdf.usaid.gov/pdf_docs/PA00ZGPC.pdf (accessed on 31 January 2023).

89. Byrne, J.; Marx, G. Technological innovations in crime prevention and policing: A review of the research on implementation and impact. *J. Police Stud.* **2011**, *20*, 17–40.

90. Dilek, S.; Çakır, H.; Aydın, M. Applications of Artificial Intelligence Techniques to Combating Cyber Crimes: A Review. *Int. J. Artif. Intell. Appl.* **2015**, *6*, 21–39. Available online: https://arxiv.org/pdf/1502.03552.pdf (accessed on 28 March 2023). [CrossRef]

91. Lin, Y.L.; Chen, T.Y.; Yu, L.C. Using Machine Learning to Assist Crime Prevention. In Proceedings of the 2017 6th IIAI International Congress on Advanced Applied Informatics (IIAI-AAI), Hamamatsu, Japan, 9–13 July 2017. Available online: https://ieeexplore.ieee.org/document/8113405/authors#authors (accessed on 20 March 2023).

92. Razi, A.; Kim, S.; Alsoubai, A.; Stringhini, G.; Solorio, T.; De Choudhury, M.; Wisniewski, P.J. A Human-Centered Systematic Literature Review of the Computational Approaches for Online Sexual Risk Detection. *Proc. ACM Hum.-Comput. Interact.* **2021**, *5*, 1–38.

93. Ramchandani, P.; Bastani, H.; Wyatt, E. Unmasking human trafficking risk in commercial sex supply chains with machine learning. *SSRN Electron. J.* **2021**, 1–31. [CrossRef]

94. Rosenberg, T. *AI Joins the Campaign against Sex Trafficking. Opinion*; The New York Times: New York, NY, USA, 2019. Available online: https://www.nytimes.com/2019/04/09/opinion/ai-joins-the-campaign-against-sex-trafficking.html (accessed on 20 March 2023).

95. Downing, S. How to Scare a Predator: Neutering the Sex Industry One Buyer at a Time. 2018. Available online: https://imprintnews.org/news-2/how-to-catch-a-predator-neutering-the-sex-industry/29426 (accessed on 20 October 2022).

96. Sunde, N.; Sunde, I.M. Conceptualizing an AI-based Police Robot for Preventing Online Child Sexual Exploitation and Abuse: Part I–The Theoretical and Technical Foundations for PrevBOT. *Nord. J. Stud. Polic.* **2021**, *8*, 1–21. [CrossRef]

97. Van der Hof, S.; Georgieva, I.; Schermer, B.; Koops, B.J.; Tourism WC, S. *Sweetie 2.0: Using Artificial Intelligence to Fight Webcam Child Sex Tourism*; Information Technology and Law Series; Springer: Berlin/Heidelberg, Germany, 2019. Available online: https://link.springer.com/book/10.1007/978-94-6265-288-0#about-this-book (accessed on 20 October 2022).

98. Street Grace. Transaction Intercept. Available online: https://www.streetgrace.org/transaction-intercept/ (accessed on 2 February 2023).

99. Rodríguez, J.I.; Durán, S.R.; Díaz-López, D.; Pastor-Galindo, J.; Mármol, F.G. C3-Sex: A Conversational Agent to Detect Online Sex Offenders. *Electronics* **2020**, *9*, 1779. [CrossRef]

100. Cook County Sheriff's Office. National Sex Trafficking Sting Nets over 630 Sex Buyers and Pimps/Traffickers. *News Release*, 6 February 2018. Available online: https://www.cookcountysheriff.org/national-sex-trafficking-sting-nets-630-sex-buyers-pimps-traffickers(accessed on 14 December 2022).

101. Spectre, R. Childsafe.Ai: World's First Ai-Platform Combating Online Child Abuse. *CIO Review*, 2020. Available online: https://law-enforcement.cioreview.com/vendor/2020/childsafe.ai(accessed on 20 March 2023).

102. Thorn. Building What We Believe: Thorn's 2021 Impact, THORN. 2021. Available online: https://www.thorn.org/impact-report-2021 (accessed on 15 December 2022).

103. Blumenthal, M. *Inside Human Trafficking Investigations*; THORN: Manhattan Beach, CA, USA, 2018. Available online: https://www.thorn.org/blog/what-human-trafficking-investigations-look-like (accessed on 15 December 2022).

104. Woods, K.; Hartsock, K. *Using Spotlight to Investigate Human Trafficking*; THORN: Manhattan Beach, CA, USA, 2018. Available online: https://www.thorn.org/blog/using-spotlight-to-investigate-human-trafficking (accessed on 15 December 2022).
105. ShadowDragon. *Osint Software, Data, and Training for Modern Investigations*; ShadowDragon: Cheyenne, WY, USA, 2022. Available online: https://shadowdragon.io (accessed on 15 December 2022).
106. Clemens, D. *Alabama Cyber Now: Disrupting Human Trafficking Using Digital Forensics & Social Media Forensics*; ShadowDragon: Cheyenne, WY, USA, 2018. Available online: https://blog.shadowdragon.io/alabama-cyber-now-disrupting-human-trafficking-using-digital-forensics-social-media-forensics (accessed on 15 December 2022).
107. Shively, M.; Kliorys, K.; Wheeler, K.; Hunt, D. *A National Overview of Prostitution and Sex Trafficking Demand Reduction Efforts, Final Report*; Abt Associates: Cambridge, MA, USA, 2012. Available online: https://www.ojp.gov/pdffiles1/nij/grants/238796.pdf (accessed on 20 March 2023).
108. Demand Forum. Tactics. 2023. Available online: https://demand-forum.org/tactics/ (accessed on 20 March 2023).
109. Shively, M. *National Assessment of Demand Reduction Efforts, Part II: New Developments in the Primary Prevention of Sex Trafficking*; National Center on Sexual Exploitation: Washington, DC, USA, 2020.
110. ATLAS.ti. *Scientific Software Development GmbH*; ATLAS.ti 22 Mac; ATLAS.ti: Berlin, Germany, 2022. Available online: https://atlasti.com (accessed on 31 January 2023).
111. Hatcher, W.; McDonald, B.D., III; Brainard, L.A. How to write a case study for public affairs. *J. Public Aff. Educ.* **2018**, *24*, 274–285. [CrossRef]
112. Verleye, K. Designing, writing-up and reviewing case study research: An equifinality perspective. *J. Serv. Manag.* **2019**, *30*, 549–576. [CrossRef]
113. Street Grace. Meet Gracie. Brochure. Available online: https://www.streetgrace.org (accessed on 20 March 2023).
114. EPIK Project. Available online: https://epikproject.org (accessed on 5 January 2023).
115. Demand Abolition. Who Buys Sex? 2019. Available online: https://www.demandabolition.org/wp-content/uploads/2019/07/Demand-Buyer-Report-July-2019.pdf (accessed on 1 February 2023).
116. Musto, J.; Thakor, M.; Gerasimov, B. Between Hope and Hype: Critical evaluations of technology's role in anti-trafficking. *Anti-Traffick. Rev.* **2020**, *14*, 1–14. [CrossRef]
117. Musto, J. *Control and Protect: Collaboration, Carceral Protection, and Domestic Sex Trafficking in the United States*; University of California Press: Berkeley, CA, USA, 2016.
118. Karsten, J. *As Criminals Adapt to New Technology, So Must International Law*; The Justice Stephen Breyer Lecture Series on International Law; Brookings: Washington, DC, USA, 21 April 2017. Available online: https://www.brookings.edu/blog/techtank/2017/04/21/as-criminals-adapt-to-new-technology-so-must-international-law (accessed on 20 March 2023).
119. Police1 Staff. The Biggest Technology Challenges Facing Police Leaders: How to Chart a Roadmap to Future-Proof Your Agency's Technology Needs. Police1, Updated 22 March 2022. Available online: https://www.police1.com/chiefs-sheriffs/articles/the-biggest-technology-challenges-facing-police-leaders-7QFimpOSEgJZRQyX (accessed on 20 March 2023).
120. Van der Watt, M. Towards a complex-systems understanding for combating human trafficking. *Cult. Policy Law Enforc.* **2014**, *3*, 218–299. Available online: https://www.cancerincytes.org/towards-a-complex-systems-understanding- (accessed on 2 February 2023).
121. Sarpong, D.; Amankwah-Amoah, J. Scenario Planning: 'Ways of Knowing', Methodologies and Shifting Conceptual Landscape. *Int. J. Foresight Innov. Policy* **2015**, *10*, 2–4. Available online: https://www.inderscienceonline.com/doi/abs/10.1504/IJFIP.2015.074397 (accessed on 2 February 2023). [CrossRef]
122. U.S. Department of State. 3Ps: Prosecution, Protection, and Prevention. Available online: https://www.state.gov/3ps-prosecution-protection-and-prevention/ (accessed on 3 February 2023).
123. OSCE. Policy Responses to Technology-Facilitated Trafficking in Human Beings: Analysis of Current Approaches and Considerations for Moving Forward, 2022. Available online: https://www.osce.org/cthb/514141 (accessed on 3 February 2023).
124. UNODC. World Day against Trafficking 2022: Use and Abuse of Technology. Available online: https://www.unodc.org/unodc/en/endht/index.html (accessed on 1 February 2023).