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Utilising the communication for development approach to prevent online child trafficking in Thailand

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In Thailand, predators use online and offline methods to exploit migrant children as forced labourers in various industries, including shrimp and seafood processing, construction and agriculture. This study examines the current status of online child trafficking and considers how the communication for development (C4D) approach can be utilised to prevent these crimes. This study reviews papers and reports published in Thailand and abroad on online child and human trafficking, prevention methods and C4D. Moreover, the study used purposive sampling and interviewed Thai government officials and representatives from non-government organisations (NGOs) with expertise in migration issues. The findings reveal that human traffickers deceive migrant children into online child labour and trafficking through unregulated online channels. However, the Thai government has collaborated with local and international NGOs to apply C4D to reach out to children seeking employment in safe online spaces to prevent child trafficking. This paper argues that C4D is helpful for raising public awareness of the threats posed by human trafficking. Simultaneously, specific labour groups employ C4D Plus, which may be applicable in the prevention of online child trafficking.

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Introduction

Human trafficking is an illegal activity (Hope for Justice 2020); therefore, the Sustainable Development Goals (SDGs) 8.7 and 16.2 require all governments “to take immediate and effective measures” to eliminate human trafficking, including all forms of child labour and human trafficking, by 2025 (International Labour Organisation [ILO] 1996–2023; United Nations [UN] 2022). ILO estimates that in 2019, approximately 5.3–24.7 million people globally were unemployed. In 2020, the year that the COVID-19 pandemic spread across the globe, approximately 20.1–35 million people became poorer. Global unemployment has led to an increase in human trafficking of migrant workers, including migrant children (Hope for Justice 2020). Moreover, quarantines due to COVID-19 led to lowered household incomes; consequently, children have been forced to work to supplement household income. The United Nations Office on Drugs and Crime’s (UNODC) *Global Report on Trafficking in Persons 2018* (hereafter, *Report on TIPs*) identified the following ratios among victims of trafficking: 50% of human trafficking victims were victims of sexual exploitation, 38% were subject to forced labour, 6% were made to participate in criminal activities, 1.5% were forced to engage in begging, 1% were placed in forced marriages and 1% experienced a combination of these forms of exploitation. In addition, the *Report on TIPs* revealed that 40% of child trafficking occurs in the Asia-Pacific region, including Thailand (Cook Alistair 2014).

The Thai government has ratified numerous international laws on child labour seeking to end all forms of human trafficking, such as ILO Convention No. 138, which establishes a minimum age for workers; ILO Convention No. 182, which seeks to eliminate the worst forms of child labour; the UN Convention on the Rights of a Child’s “Optional Protocols on Armed Conflict, the Sale of Children, Child Prostitution and Child Pornography”; the Convention on the Protection of the Rights of All Migrant Workers and Members of their Families; and the Palermo Protocol on TIPs (ILO 1996–2017; Uluca et al. 2022, p 1184; Alsamawi et al. 2019; Grisewood et al. 2008; Smales 2011).

Recent reports have demonstrated the Thai government’s proactive response to address child labour and trafficking. For instance, the 2022 *Report on TIPs* replaced Thailand at tier two (US Department of State 2022). According to this report, the Thai Internet Crimes Against Children Task Force investigated 14 cases of potential child labour trafficking in 2020 and 22 such cases in 2022. Similarly, the Royal Thai Police filed 39 cases of child labour exploitation, while Thailand’s Department of Special Investigation (DSI) prosecuted one child labour case (Uluca et al. 2022, p 1185). Similarly, a 2021 report by the authors stated that Thailand had achieved moderate advancements in addressing child labour and human trafficking. That is, Thailand has strived to prevent “the worst forms of child labour” by passing and implementing various laws and policies (p 22).

However, migrant children from Myanmar, Laos and Cambodia continue to be exploited for labour in Thailand, where they work in various sectors such as agriculture, construction, shrimp and seafood processing and domestic work (Uluca et al. 2022, p 1182–1183). To prevent child labour and trafficking, the Thai government, local NGOs and international organisations have collaborated and used the communication for development (C4D) approach to increase public awareness of child exploitation and the risks posed by human trafficking to children (Skuse and Downman 2012).

Research questions:

- (1) How does online child trafficking occur?
- (2) How has C4D been applied to prevent online child trafficking?

Research objectives

- (1) To investigate occurrences of online child trafficking.
- (2) To examine how C4D has been applied to prevent online child trafficking.

Literature review

This paper examines numerous scholarly articles and reports to discuss how technology was used to facilitate child labour, child trafficking and online trafficking during the COVID-19 pandemic. Furthermore, this study examines how C4D can be used to prevent cyber trafficking.

Linkage between technology and child trafficking. Many scholars have proposed similar explanations regarding the use of technology in facilitating human trafficking. For example, the Organisation for Security and Co-operation in Europe (OSCE 2020) states that technology-enabled trafficking in human beings utilises “social media platforms, applications and websites” that facilitate the exchange of goods and services between buyers and sellers, including child labour (p 15). That is, traffickers advertise and sell victims to customers using these communication platforms (OSCE 2020, p 15, 17). Nicola et al. (2017) report that social media platforms, such as Facebook, Twitter, WhatsApp and Viber, are the most common communication platforms used by online users.

Furthermore, the term “digital” encompasses various devices and technologies (Van Reisen et al. 2019). Users can access data through the services provided by various technology companies, including Google, Facebook, Microsoft and Amazon (Van Dijk et al. 2018). Thus, social media platforms have become tangible and intangible resources that attract different users searching for information (Van Reisen et al. 2019).

The increasing number of Internet users has resulted in increased sexual exploitation and forced labour (UN Global Initiative to Fight Human Trafficking [UN.GIFT] 2008). For example, the activities of online mail-order bride agencies have resulted in increased sexual exploitation, forced marriages and domestic slavery. However, the Internet does not only facilitate human traffickers but can also be a mechanism to combat such activities (Mendel and Sharapov 2016).

To target and exploit children for labour and sexual services and interact and facilitate transactions with buyers, human traffickers use various devices and technologies, including the Internet, email, peer-to-peer networks and web messengers. These technologies have rendered children increasingly vulnerable to exploitation (International Centre for Missing and Exploited Children 2018). Cook Alistair (2014) reveals how traffickers use mobile phones to directly approach and communicate with prospective victims, including children. Human traffickers from Europe, Latin America and Asia use the Internet and social media to recruit labourers from remote areas (OSCE 2020). According to the UN Slavery Convention of 1926, when subject to debt bondage or modern slavery, children are largely powerless and are under the complete control of their captors (Smales 2011). UN Resolution 49/166, passed by the UN General Assembly (UNGA) in 1966, condemns human trafficking for the purpose of forced labour (Weissbrodt and Anti-Slavery International 2002). Subsequently, efforts to address human trafficking have included creating risk monitoring and evaluation systems as tools to ensure the security of all workers (Fors-Owczynik 2016).

Online child trafficking during the COVID-19 pandemic. Several articles have reported that online child labour trafficking

occurred during the COVID-19 pandemic. According to a UNODC (2020, p 1) report, the COVID-19 pandemic negatively impacted global economic growth. Furthermore, the pandemic resulted in increased unemployment and lowered revenues, weakening the financial status of many workers and rendering them increasingly vulnerable to human trafficking. Migrant children whose parents lost their jobs were forced to search for employment online in sectors such as the fishing, textile and agriculture industries.

It is imperative to recognise that traffickers have shifted to using online communications to target victims (International Centre for Missing and Exploited Children 2018). There is a strong link between Internet use and child labour trafficking. Predatory recruiters increasingly use the Internet to procure forced labourers in sectors such as plantations and construction (OSCE 2020). Internet-based trafficking occurs on various online platforms, and traffickers use various tools, such as employment advertisements and services (UNODC 2021). Furthermore, traffickers have utilised advanced digital communication platforms to operate illegal businesses during the COVID-19 pandemic (UNODC 2020).

A UNODC report (2020) reveals that, during the COVID-19 pandemic, a number of human traffickers were able to evade government authorities by shifting their recruitment efforts and focus online. Consequently, victims have become increasingly invisible. In particular, because children tend to be active on online platforms, they are exposed to increased risk of cyber trafficking, including for the purpose of child labour. Moreover, government-implemented lockdowns and quarantine policies restricted authorities and NGOs from providing appropriate assistance and support to victims, such as assisting in victim identification and providing legal consultations. Further, common communication channels collapsed due to restrictions placed on movement.

Therefore, due to the increase in cyber trafficking, it is necessary to implement preventive measures in online and offline spaces (UNODC 2021). Various scholars have discussed the link between migrants and vulnerable groups to human trafficking and forced child labour (David et al. 2019). Digital technologies have expanded the scope of communication channels that human traffickers can use to exploit victims searching for employment. Employment can provide improved economic stability and enhanced social resources for migrant workers (Mawere 2019; De Haas 2010; Ong'ayo 2019; Van Reisen et al. 2019; Mendel and Sharapov 2016). Several scholars have argued that technology has impacted the social fabric of communities (Van Stam 2017), as well as social protection and security systems (Mawere 2019). Digital technologies have created new social spaces that can be referred to as “black holes of informational capitalism” (Van Reisen et al. 2019). That is, digital technologies have created the so-called “dark side” of the web. The “dark web” comprises “applications or platforms helping in retrieving and uploading data from and into domain within the deep and dark web” (OSCE 2020) to exploit victims for human trafficking (Rhodes 2017; Mawere 2019; Movsisyan 2019). However, due to the Thai government’s ineffective labour inspections and protections, once a migrant becomes a victim of human trafficking, they are rarely able to escape (UN Thematic Working Group on Migration in Thailand 2019).

Communication for development as a strategy for preventing cyber trafficking. Several organisations have demonstrated that communication is vital for combating cyber trafficking. The “4 Ps” approach (prevention, protection, prosecution and partnership) is an advanced strategy for combating online human

trafficking (UNODC 2013; Cook Alistair 2014). Detering human trafficking requires stakeholders to address key elements – including the push-and-pull and demand-and-supply factors – that motivate such crimes. Article 31 of the Organized Crime Convention stipulates that member states must adopt a human trafficking prevention strategy. Moreover, Article 9 of the UN Palermo Protocol highlights various prevention measures that can be used to warn potential victims from vulnerable groups (UNODC 2008).

The UN High Commissioner for Human Rights issued Guideline No. 7, which requires stakeholders to make a strong commitment to collaborating with each other to prevent human trafficking (Rhodes 2017). In addition, the Recommended Principles and Guidelines on Human Rights and Human Trafficking (E/2002/68/Add.1) established guidelines and prevention strategies for mitigating the risks and vulnerabilities associated with migration (UNODC 2008).

Furthermore, the UNODC (2008) asserts that communication strategies employing clear messaging can increase awareness of trafficking in persons and, in turn, empower people to protect themselves from human trafficking. Such an approach involves conveying “the true nature of the crime and its consequences” to stakeholders, specifically vulnerable groups such as children. These efforts include messaging campaigns, training sessions and programmes. Helplines and hotlines established by governments in the home and destination countries of victims of human trafficking can provide direct assistance. Meanwhile, the Issara Institute discussed the importance of “empowering” survivors of human trafficking. That is, they stressed that survivors can take control of their lives in order to live better lives. In this way, the Institute seeks to create positive changes in the lives of survivors (Dasgupta and Soto 2018).

Likewise, the International Programme on the Elimination of Child Labour has implemented projects to prevent child labour by empowering the most vulnerable and marginalised people in society, including adults, adolescents and children. They facilitate such people in obtaining decent work and expressing the challenges they face and their needs. Amplifying the voices of workers spreads awareness about the manipulation used by perpetrators and avoid violence related to child labour, forced labour and child trafficking. Moreover, trade union representatives have played critical roles in collecting testimonies from workers (ILO 2018).

United Nations agencies have used C4D to boost interpersonal communication “within communities and between communities and policymakers” as a tool for achieving “human development goals” (UN Development Programme 2011; Edberg et al. 2017). The C4D approach comprises two different development models: the diffusion/mechanistic and participatory/organic models. Regarding motives for co-operation, the diffusion/mechanistic model posits that people require help and promotes charitable activities. Meanwhile, the participatory/organic model holds that people can help themselves and promotes their empowerment. Regarding communication mechanisms, the diffusion/mechanistic model uses mass media, whereas the participatory/organic model uses integrated media planning and interpersonal communication. Regarding the mode of communication, the diffusion/mechanistic model promotes monologue and consultation, while the participatory/organic model focuses on facilitating dialogue. Finally, the diffusion/mechanistic model highlights curing symptoms and evolutionary change while the participatory/organic model seeks to eradicate the root causes of problems and facilitate structural change (Servaes 2003).

Co-operation between the UN Children’s Fund (UNICEF) and the South African Government is an example of the implementation of C4D. Both parties cooperated on implementing a

campaign to strengthen schools, as well as the non-government and private sectors. For example, they used mass media messaging to promote dialogue among community members, including parents, teachers and young people (Edberg et al. 2017). Furthermore, the MTV EXIT (End of Exploitation and Trafficking) campaign has collaborated with multiple organisations in Southeast Asia to prevent human trafficking by providing specific training programmes for government authorities, law enforcement and universities (Skuse and Downman 2012).

Parents, community leaders, media practitioners and teachers should raise awareness about technology-enabled trafficking (UNODC 2015; Grisewood et al. 2008). Furthermore, mobile phone applications and other Internet applications are optimal technologies for explaining to children how to avoid online predators (Cook Alistair 2014). Finally, all stakeholders (e.g. the public and private sectors, NGOs and the global community) must establish reliable communication platforms that can function as safe online spaces.

This study comprehensively examines the role of Internet technologies in the sexual exploitation of children. Previous studies have recommended training law enforcement agencies in the prevention of such crimes in collaboration with the public and private sectors and NGOs (UNICEF East Asia and the Pacific Regional Office 2020). These measures, however, do not include migrant workers.

Conceptual framework. Online child labour trafficking refers to using online platforms to target children for the purpose of forced labour (UNODC 2021). The term “cyber trafficking” is used to emphasise the correlation between Internet technologies and human trafficking (Sykiotou 2017). Using computers, mobile phones and other communication devices, traffickers visit unregulated online spaces, such as the dark web, which are rife with unreliable information, to target potential victims. However, they also utilise relatively safe online spaces with a mixture of reliable and unreliable information, such as websites hosted by governmental agencies, local NGOs and labour organisations. Both types of online spaces require access to the Internet tools, such as email services (e.g. Hotmail and Gmail), social media websites (e.g. Facebook and Instagram) and web applications (e.g. LINE). Many potential victims of forced labour, including children, are at risk of being deceived into entering dangerous online spaces. Predators have invested into and developed cyber trafficking methods that expand the scope of online recruitment spaces to lure potential victims (Rhodes 2017). Trafficking strategies include “hunting” and “fishing”. Hunting refers to actively approaching victims in online spaces; meanwhile, fishing refers to waiting for potential victims to respond to certain ads posted by the perpetrators (UNODC 2021).

In the context of the expansion of cyber child trafficking for the purpose of forced labour, the UNGA (2015) has identified ending child trafficking by 2030 as one of its SDGs. Moreover, the UNICEF strategic plan from 2018 to 2021 highlighted the utility of the C4D approach in eradicating child trafficking in accordance with the SDGs. The C4D approach enables various stakeholders, including vulnerable groups and public and private stakeholders, to participate in communication processes and information exchange to raise awareness of violence against children, such as child trafficking for forced labour. This paper examines the relationships between the impact of such crime and violence on potential victims, including the acquisition of the knowledge and skills necessary to avoid becoming victims of such crimes (Sood et al. 2019).

This study applies the C4D approach (Fig. 1), which includes “situation analysis, barriers and motivators, communication goals

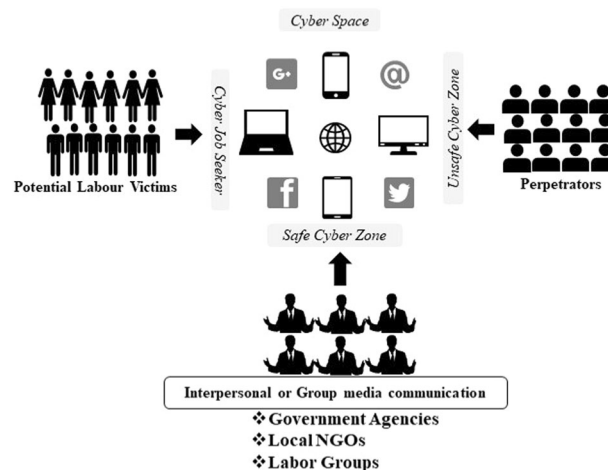


Fig. 1 Communication for development approach in cyber child trafficking interventions (author's design). Source: Sood et al. (2019).

and objectives, audience segmentation, communication approaches, communication activities, [a] monitoring and evaluation framework and [an] implementation plan” (Sood et al. 2019) to prevent online child trafficking. In particular, this study focuses on the communication channels used to communicate with potential victims to prevent online child trafficking. The term “communication channels” refers to interpersonal or group forms of communication (e.g. peer-to-peer communication and local support groups), as well as interactive digital technologies (e.g. mobile phones and the Internet).

Methods

This paper employs a phenomenological research approach to elucidate the current status of online child trafficking for the purpose of forced labour as well as prevention strategies implemented by governments, NGOs and international organisations, such as C4D. To better understand online child trafficking and the C4D strategies proposed by various stakeholders, this study analyses secondary and primary data. Moreover, it employs the triangulation method to analyse document data and evidence. The data used in this study include various scholarly research papers and reports on online child trafficking published by the Thai government, intergovernmental organisations and NGOs. This study further conducts an extensive literature review to clarify the nature of online child trafficking, as well as Thai national and international laws to prevent cyber trafficking and forced labour.

Moreover, this study used purposive sampling to interview reliable informants. The interview questions were designed and classified based on the roles, knowledge and experiences of each participant group to confirm the findings from the literature review and engage in further discussion. These in-depth interviews lasted 1–2 h each. They were conducted between June 2019 and July 2020 on days that were convenient for the interviewees via Zoom. All informants consented to their statements being used verbatim in the study.

The following list describes the interview participants and the reasons for their selection:

1. Three government officials from the Ministry of Social Development of Human Security, which is central to the government's efforts in addressing human trafficking, and the Ministry of Labour Protection and Welfare, a critical agency for ensuring protections related to labour exploitation.

2. Two law enforcement officers from the DSI, a leading human trafficking agency. These officers acknowledged the role of technology in child labour exploitation and have been involved in implementing preventive measures for battling this transnational crime.
3. One representative from the Office of the Council of State, who updated the interpretation of the anti-human trafficking law and its implementation.
4. Two NGO workers who have worked closely with migrant workers and have applied approaches to combating technology-facilitated human trafficking in Thailand.

Data analysis. After compiling, the qualitative data were coded and categorised into themes based on the components of the C4D approach. Then, the study identified the significant points of each theme to reflect the correlations between online child trafficking and C4D.

Study site. This project was conducted in Samut Sakhon, a leading province in the crackdown on human trafficking. Various governmental agencies, NGOs and scholars have made progressive efforts to prevent online child trafficking in this province (Buachai 2014)¹.

Ethical considerations. Prior to data collection, a Certificate of Ethical Approval was obtained from the Internal Review Board of the Institute for Population and Social Research (IPSR-IRB: COA. No. 2019/04-124). A participant information sheet containing details about the research project was presented to all participants; afterwards, they provided their informed consent. Moreover, identifying information, such as participants' names and physical addresses, was kept confidential for their safety. The participants were informed of their right to withdraw from the study at any time.

Results

This section discusses the methods of online child trafficking for the purpose of forced labour and reflects on the aspects of C4D that could be applied to the prevention of child trafficking.

Cyber trafficking for the purpose of forced child labour. The participants confirmed that online child trafficking and forced child labour occur in Thailand, which aligns with the results of previous studies. Global economic growth has resulted in the expansion of the transnational human trafficking market (Aronowitz 2001). Moreover, the victims of human trafficking, including victims of forced labour, are often vulnerable individuals such as children (UNODC 2016; Cockbain and Bowers 2019; Cockbain and Olver 2019; Edberg et al. 2017). Forced labour, including child labour in the Thai fishing industry, has impacted the global community (Stephens 2017). Using online communication platforms, perpetrators entice children with "false promises of good work and a good life". This occurred during school closures resulting from COVID-19 lockdowns (Hope for Justice 2020).

During school closures, children spent considerable time online learning, gaming and socialising, exposing themselves to sexual predators, debt bondage and human trafficking for the purpose of forced labour. Moreover, government authorities were unable to detect this exploitation due to the dearth of pandemic-related measures (UNODC 2020).

Children from poor families, particularly migrant children, are at risk of being trapped in debt bondage and situations of forced labour (Hope for Justice 2020), harming their development and

depriving them of their right to an education (Grisewood et al. 2008). Approximately 31 million migrant children have become victims of human trafficking and forced labour (David et al. 2019; Mawere 2019). The UNODC (2021) reports that approximately 16% of children trafficked for forced labour come from the Asia-Pacific region, including Thailand. They are exploited in industries such as "domestic work, construction work, fishing, agriculture, catering, street trading, garment, mining and others".

Migrant domestic workers, children and women have been subjected to debt bondage by recruitment agencies that mistreat and degrade human beings, treating them as objects (Smales 2011). These workers are in debt to recruitment agencies or smugglers for the expenses associated with migrating, such as those for transportation and food. The worst situation is when women continually pay off debts because they are expected to send remittances to their families (Smales 2011).

In countries such as Thailand, local brokers directly recruit migrants from remote areas, and these migrants must make payments for the services provided by such brokers. Furthermore, these migrants are often deceived by false promises, resulting in migrants being trapped by their high-interest debts (OSCE 2020).

In Thailand, the term "cyber trafficking" is not well-known, especially among children at risk of becoming forced labourers. Thus, its scope should be clarified as cyberspace or cyber zone because people meet on various online platforms for various purposes. For instance, migrants may visit online spaces in search of employment. Simultaneously, DSI agents and a researcher have found that perpetrators spread deceptive advertisements on the dark web to lure vulnerable migrants who are desperate for employment². However, law enforcement officers and scholars insist that these migrants consider attending a safe cyber zone provided by government agencies, local NGOs and labour groups for reliable information (Sykiotou 2017). Alternatively, migrant children tend to search online for employment opportunities. Unsurprisingly, online games have attracted a different form of human trafficking for the younger generation; these games feature real stories of human trafficking, such as "Missing: Game for a Cause, Act! BAN Human Trafficking!" and "Slavery Footprint" (OSCE 2020).

Trafficked labour in the commercial fishing industry is another form of modern slavery. In this sector, migrant children are forced to work long hours without proper leisure or rest. Traffickers physically and psychologically torture victims if they do not complete their duties. For instance, commercial fishermen operating in Russian and Turkish waters were coerced to work long hours without food and were physically abused. Similarly, at shrimp processing factories, offenders mistreated migrant workers and children and forced them to work extremely long hours (Weitzer 2020).

Although the number of online child trafficking cases that involve forced labour is lower than that of other cases of human trafficking in Thailand (Movsisyan 2019), there remains a lack of awareness regarding the nature of such cybercrimes, implying the presence of many more victims. Human traffickers conduct financial transactions using digital technologies because they are less expensive and faster, as well as simpler to access and use. Communication and financial transactions are two major elements of the human trafficking business. Therefore, human traffickers employ old and new technologies to target child victims and escape detection from the authorities (UN.GIFT 2008).

Many scholars have noted that online spaces constitute convenient platforms for facilitating modern slavery, enabling cartels to target migrants who search online for employment (Nedelcu 2012; Janta and Ladkin 2013). Moreover, these workers are physically and psychologically abused during the offshoring,

subcontracting and outsourcing process (Fuchs 2013; Mendel and Sharapov 2016). Unfortunately, ignorance of these crimes remains high and spreading awareness has proven challenging (Bauman 2000). David Westlake, head of the anti-slavery group International Justice Mission UK, agreed that Internet service providers have served as “vulnerable mediums for exploitation and abuse” (Movsisyan 2019).

Applying the communication for development approach to prevent cyber trafficking and forced child labour. The participants stated that the Thai government, local NGOs and international organisations have applied the C4D approach through two channels. The first channel pertains to interpersonal and group forms of communication, such as peer-to-peer communication and local support groups. The second channel comprises digital media and interactive technologies, including mobile phones and the Internet. These communication methods can be used to intervene in online child trafficking for the purpose of forced labour. Specifically, local NGOs and labour organisations have provided prospective and current workers with cyber trafficking awareness training and lessons.

Rather than the C4D approach, the Thai government tends to use legal instruments—such as interpersonal and group forms of media communication, as well as digital media and interactive technologies—to combat online child trafficking and forced child labour. In 2018, the government ratified the Protocol to the Forced Labour Convention (No. 29) of 1930 to ensure safe working conditions for migrant workers. In addition, it modified the Anti-Trafficking Persons Act, requiring the implementation of a protocol to identify the “structural risks of exploitation” threatening migrant workers (UN Thematic Working Group on Migration in Thailand 2019).

Laws, policies and research findings have been codified and modified to combat the increased expansion of trafficking in persons (Cockbain and Bowers 2019; Gozdzik and Bump 2008; Weitzer 2015; Gallagher 2017). The Thai government amended the Royal Ordinance on the Management of Employment of Foreign Workers to protect migrant workers. This ordinance outlawed charging recruitment fees from workers; broadened their freedom of choice within the labour market; established guaranteed deposits, clear licensing requirements for inbound recruitment and a fund for migrant worker residents; banned the confiscation of identification documents; and facilitated the creation of a tripartite committee for strengthening migration laws (UN Thematic Working Group on Migration in Thailand 2019).

Moreover, a cabinet resolution created Migrant Worker Assistance Centres (MWACs) in 10 pilot provinces. This is an example of a progressive effort by the Thai government to promote and protect the rights of migrant workers. However, to combat human trafficking, the government should also oversee the creation of communication platforms, such as WhatsApp-style chat rooms and social media platforms; publish online reports; and establish helplines (Hope for Justice 2020). Moreover, the government should encourage collaborations between the public sector and NGOs to provide training that can enhance the productivity of MWACs (UN Thematic Working Group on Migration in Thailand 2019).

This study confirms the strong commitment of the private sector and local NGOs to creating safe online spaces that can serve as communication platforms to help prevent online child trafficking and forced child labour. Such efforts would supplement the insufficient prevention measures taken by the Thai government. Therefore, individuals seeking employment opportunities abroad should visit official websites of private institutions

and local NGOs. For example, Microsoft has introduced an anti-human trafficking feature intended to empower vulnerable people in the Asia-Pacific region. To this end, Microsoft collaborated with the Mirror Foundation and other private agencies in Thailand to combat human trafficking. Moreover, Microsoft empowered vulnerable groups, particularly children, by enhancing their communication and technical skills (UN.GIFT 2008).

Similarly, the Asia Foundation has persuaded isolated anti-trafficking groups to share valuable information with potential victims of human trafficking and people subjected to similar crimes. Meanwhile, the Issara Institute has designed digital tools that migrant workers can use to share the details of their working conditions with other workers. Such tools can empower workers and encourage them to raise their voices (Farbenblum et al. 2018).

Furthermore, the Issara Institute’s inclusive labour monitoring system empowers Burmese, Cambodian and Thai workers by encouraging the use of social media channels, helplines and a Burmese-language Android app called “Golden Dreams” to exchange information on employers and recruitment agencies, as well as problems at work. Notably, migrant workers can make free calls through the app. After collecting data on the views of workers, the Institute distributes the findings to business owners, supply chain stakeholders and others involved in employment (Farbenblum et al. 2018).

As an active local NGO in Samut Sakhon, the Labour Protection Network (LPN) offers an online live feed of events such as anti-human trafficking training sessions, to advertise LPN and raise awareness about labour exploitation among current and future migrant workers. Similarly, the LPN provides free Wi-Fi access to those visiting their offices. LPN has approximately 200,000 followers on its Facebook page, including migrant worker groups from Myanmar, Cambodia and Laos, NGO networks, Thai government agencies and Thai businesses. The LPN has also established a labour hotline where migrant workers can request for legal assistance³. Meanwhile, the Thai government has only posted the laws or some information on their websites.

Consequently, collaboration among agencies is required to construct online platforms that can improve knowledge-sharing among migrant workers (including children), public- and private-sector actors and other stakeholders. This platform provides workers access to reliable sources for selecting reliable employers⁴.

The ILO report states that more than 40% of people who migrate from Myanmar to Thailand suffer from low-trust written contracts (Harkins et al. 2017). To end human trafficking and forced labour, the Issara Institute is educating migrants by sharing information about recruiters and brokers via various online communication platforms and tools, including blockchain technology. This measure enables migrants to protect themselves from labour exploitation. Such tools offer contracts enshrined under related laws across languages and are provided at the offices of migrant workers (OSCE 2020).

MissMigration is a Facebook chatbot that uses artificial intelligence to automatically answer migration-related questions and requests to mitigate the risks associated with human trafficking. Similarly, FairAgora has created a labour monitoring system for use in the fishing industry that helps regulate the activities of employers in Thailand. This system demands that employers display their (1) contracts, (2) photos, (3) visa and work permits (if applicable) and (4) contact details. These details reduce human trafficking risks because they enable FairAgora to directly monitor the recruitment process and contact employers when needed. As an alternative to the legal approaches of government authorities, OSCE, (2020) seeks to prevent such crimes through awareness-raising campaigns targeting vulnerable migrants who belong to at-risk communities.

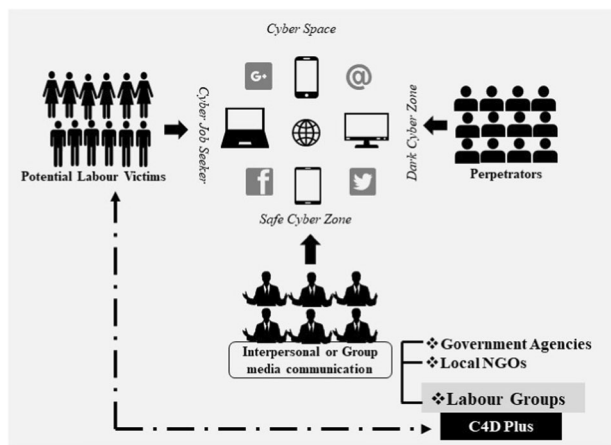


Fig. 2 Communication for development “plus” approach in cyber child trafficking interventions (author’s design). Source: Sood et al. (2019).

It is important to acknowledge that migrant workers often trust advertisements on Facebook more than government sources. For instance, Filipino migrant labourers tend to rely on sources other than the Philippines Overseas Employment Administration, which oversees all labour recruitment agencies (Latonero et al. 2015; OSCE 2020).

Discussion

This section details how government agencies, local NGOs and international organisations have applied the C4D approach to prevent online child trafficking. These findings support the efficacy of peer-to-peer communication and local support groups (i.e. interpersonal and group communications). In contrast, these organisations have used mobile phones and the Internet (digital media and interactive technologies). However, the C4D approach may be inefficient for combating cyber trafficking. Therefore, this study suggests collaboration among government agencies, local NGOs, international organisations and labour organisations to facilitate interpersonal and group media communication with victims of forced labour. This approach is referred to as “C4D Plus” (Fig. 2).

Interpersonal and group forms of media communication.

According to the initiatives mentioned above, online users must directly engage with reliable agencies to avoid human trafficking. Brokers typically visit the villages of victims due to the lack of language barriers; however, Thai migrants may be victimised through online channels. Migrant workers should directly contact the embassies and NGOs of Myanmar, Cambodia and Laos instead of unknown brokers⁵. The C4D Plus approach can be applied to preventing online child trafficking. This study urges potential migrant workers to contact existing worker groups in Thailand before leaving their home country. This is because many current migrant workers are using messaging apps and social media to share their working conditions and prevent human trafficking. These digital tools strengthen peer-to-peer relationships (Farbenblum et al. 2018). Srakaew explains that Samut Sakhon serves as a model for anti-human trafficking in the country, as it has pursued collaboration with stakeholders, including the private sector⁶. Furthermore, migrant labour groups in Myanmar, Cambodia and Laos aim to recruit people who can provide updated information for each group⁷.

Migrant labour organisations share updated national regulations and policies on safe, regulated online spaces to break the cycle of human trafficking and warn potential migrants about such crimes. The confiscation of one’s passport allowed by the law should be prevented or revealed to avoid human trafficking⁸.

Currently, the Thai government imposes this matter under Section 62 of the Foreigners’ Working Management Emergency Decree (No. 2) and BE 2561 (2018), which was enacted on 24 March, 2018. BE 2561 issues the following amendment of Section 131:

Any person confiscating a foreigner’s work permit or identification card shall be imprisoned for a term not exceeding six months or a fine of ten thousand baht to one hundred thousand baht or both.

According to Paragraph 1, if a foreign worker agrees to have a person take possession of their work permit or personal documents, they must allow the foreign worker access to this document at any time as requested by the foreign worker. If this regulation is violated, they shall be liable to the same penalty as per the offence described under Paragraph One.

Similarly, migrant workers in Samut Sakhon regularly share news via Facebook and LINE. Local government offices should support working agencies by supplying online communication channels where migrant workers can rapidly contact each other⁹.

In addition, the Thai government should establish an anti-human trafficking office that can serve as a central database of information about human trafficking and legal initiatives. Government employees (e.g. judges, prosecutors and lawyers) could share updated information, which would enable workers to examine relevant case studies and help prevent crimes¹⁰.

The C4D Plus approach can substantially benefit migrant workers or labour organisations by enabling sharing of insightful experiences with future and current migrant workers. This will help safeguard migrant workers from the cycle of human trafficking through internal and closed-access communication platforms. According to the C4D Plus approach, labour groups will only accept migrant labourers who were introduced to the network by their relevant labour organisation. This will ensure the security of vulnerable migrant workers.

Digital media and interactive technologies. Digital technologies offer advantages and disadvantages. They have resulted in various violations of human rights, such as the right to personal data protection and privacy (Fors-Owczynik 2016; Álvarez 2022). For example, digital technologies can be used to unlawfully track and monitor child labourers or reveal their identity and personal information. Conversely, technology can be used to ensure the prevention of human trafficking (Fors-Owczynik 2016). Technology can be helpful in detecting forced labour. Moreover, law enforcement authorities, government officials and NGO workers can tackle human trafficking by identifying suspicious job advertisements (Volodko et al. 2020). Several scholars have revealed that government and non-governmental agencies have realised the advancement of technology used by human traffickers. Organised criminal organisations use high-speed Internet technology to facilitate modern slavery (Cunningham 2015). Society cannot remain ignorant of these crimes and serious action is needed. Indeed, ignorance of these technologies is a critical link between the use of these technologies and human trafficking, resulting in the exploitation of certain vulnerable individuals (Bigo 2012). Surprisingly, raising awareness of human trafficking among the public and policymakers remains challenging, even in European countries such as the United Kingdom, Hungary and Ukraine (Mendel and Sharapov 2016).

This study suggests that online communication platforms can be used to ensure the safety of migrant workers and combat online child trafficking. The SDGs seek to ensure the safety of migration processes and eliminate human trafficking. The global community seeks to guarantee education for all and a “properly resourced, accessible, and quality education system” (Grisewood et al. 2008). Eliminating trafficking by

2030, including forced child labour, is the objective of SDG 10.7, which refers to the “orderly, safe, and responsible migration and mobility of people” (David et al. 2019). Moreover, additional strategies, such as establishing a minimum age of employment and codifying compulsory education, have been implemented to combat human trafficking (Grise-wood et al. 2008). The Internet can be used to improve law enforcement databases containing criminal records and victim identities. Lastly, global collaboration between government and non-government sectors is required to combat child trafficking (Cook Alistair 2014).

Conclusion and recommendations

Online child trafficking for the purpose of forced labour is a form of modern slavery. Moreover, predators (e.g. recruiters, brokers and traffickers) are increasingly utilising technology to carry out such crimes. Thus, vulnerable groups, particularly impoverished migrant children, are manipulated by predators making false promises on online communication platforms. This study argues that although traffickers use the online spaces on the dark web to distribute misleading information, local Thai NGOs have been able to use the Internet to combat such behaviour. For example, they have applied the C4D approach to share relevant anti-cyber trafficking information on safe online spaces with users, including children, to raise awareness of such crimes.

Moreover, this study contributes to the literature by proposing a strategy known as “C4D Plus”, referring to collaborations of labour organisations (rather than government agencies, local NGOs and international organisations) in the use of interpersonal and group media communication platforms to engage with potential victims of forced labour. For instance, labour organisations have used this approach to prevent online child trafficking for the purpose of forced labour by directly sharing recruitment opportunities and warning potential victims, including children, about the dangers of human trafficking. Further studies should focus on monitoring and evaluating the effectiveness of the C4D Plus strategy to enhance anti-cyber trafficking efforts and prevent forced child labour. Finally, future studies should recruit migrant workers and their children as study participants to learn about their perspectives of incidents of online child trafficking.

Data availability

This paper is part of a research project titled “Technologies and Human Trafficking in Thailand”. All data supporting the study’s findings are included in the article and have been properly cited. Since no data were generated or analysed, data sharing does not apply to this study.

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Notes

- 1 Srakaew, personal communication, 2 July 2019
- 2 DSI, personal communication, 25 June 2019
- 3 Srakaew, personal communication, 17 June 2019
- 4 Srakaew, personal communication, 2 July 2019
- 5 Srakaew, personal communication, 2 July 2019
- 6 Srakaew, personal communication, 2 July 2019
- 7 Srakaew, personal communication, 2 July 2019
- 8 Srakaew, personal communication, 2 July 2019
- 9 Representative of Samut Sakhon’s Governor Office, personal communication, 17 June 2019
- 10 Thamthanarug, personal communication, 20 June 2019

References

- Alsamawi A, Bule T, Cappa C et al (2019) Measuring child labor, forced labor, and human trafficking in global supply chains: a global input–output approach. *Technical Paper, International Labor Organization For Economic Cooperation and Development, International Organization for Migration and United Nations Children’s Fund*. https://www.ilo.org/wcmsp5/groups/public/---ed_norm/---ipecc/documents/publication/wcms_733916.pdf. Accessed 30 July 2021
- Álvarez JG (2022) The impact of information and communication technologies on human trafficking. *European Student Think Tank*. <https://esthinktank.com/2022/10/12/the-impact-of-information-and-communication-technologies-on-human-trafficking/>. Accessed 15 December 2023
- Aronowitz AA (2001) Smuggling and trafficking in human beings: the phenomenon, the markets that drive it and the organisations that promote it. *Eur J Crim Policy Res* 9(2):163–195. <https://doi.org/10.1023/A:1011253129328>
- Bauman Z (2000) Ethics of individuals. *Can J Socio* 25(1):83–96. https://doi.org/10.1007/978-3-663-10334-9_11
- Bigo D (2012) Security, surveillance, and democracy. In: Ball K, Haggerty K and Lyon D (eds) *Routledge handbook of surveillance studies*. Routledge, Abingdon, p 277–284
- Buachai W (2014) Ministry of Labor, inspection team monitors fishery workers in Samut Sakhon province. *Ministry of Labor*. <http://www3.mol.go.th/en/anonymouse/news/35298>. Accessed 30 July 2021
- Cockbain E, Bowers K (2019) Human trafficking for sex, labour and domestic servitude: how do key trafficking types compare, and what are their predictors? *Crime, Law Soc Chang* 72:9–34. <https://doi.org/10.1007/s10611-019-09836-7>
- Cockbain E, Olver K (2019) Child trafficking: characteristics, complexities, and challenges. In: Bryce I, Petherick W, Robinson Y (eds) *Child abuse and neglect: forensic issues in evidence, impact, and management*. Elsevier, New York, p 95–116
- Cook Alistair DB (2014) A non-traditional security threat in Asia: cyberspace and human trafficking? In: Wilhelm H and Patrick R (eds) *Trafficking in human beings: learning from Asian and European experiences*. Konrad-Adenauer Stiftung and European Union, Singapore, p 97–107
- Cunningham F (2015) A modern response to modern slavery. Centre for Social Justice, London
- Dasgupta S, Soto AM (2018) Psychometric measures of empowerment and disempowerment of survivors of human trafficking: developing and piloting tools to assess the positive and negative impacts of post-trafficking interventions and environments on trafficked persons. Issara Institute, Bangkok
- David F, Bryant K, Larsen JJ (2019) Migrants and their vulnerability to human trafficking, modern slavery, and forced labor. International Organization for Migration, Geneva
- De Haas H (2010) Migration transitions: a theoretical and empirical inquiry into the developmental drivers of international migration. *Working Paper-Project Paper No. 24*, 2010. International Migration Institute, Oxford
- Edberg M, Shaikh H, Rimal RN et al. (2017) Development of a communication strategy to reduce violence against children in South Africa: a social-ecological approach. *Afr J Inf Commun* 20:49–76. <https://doi.org/10.23962/10539/23576>
- Farbenblum B, Berg L, Kintominas A (2018) Transformative technology for migrant workers: opportunities, challenges, and risks. Open Society Foundations, New York
- Foreigners’ Working Management Emergency Decree (No. 2), B.E. 2561 (2018), enacted on March 24, 2018. Department of Employment. https://www.doe.go.th/prd/assets/upload/files/legal_th/92b6c499912462207f579dea958cf8a2.pdf. Accessed 15 December 2023
- Fors-Owczynik KL (2016) Prevention strategies, vulnerable positions and risking the “identity trap”: digitalized risk assessments and their legal and socio-technical implications on children and migrants. *Inf Commun Technol Law* 25(2):71–95. <https://doi.org/10.1080/13600834.2016.1183307>
- Fuchs C (2013) Theorising and analysing digital labor: from global value chains to modes of production. *Polit Econ Commun* 1(2):3–27
- Gallagher AT (2017) What’s wrong with the global slavery index? *Anti-Traffick Rev* 8(8):90–112. <https://doi.org/10.14197/atr.20121786>
- Gozdziaik E, Bump M (2008) Data and research on human trafficking: a bibliography of research-based literature. *Final Report for the US Department of Justice*. Institute for the Study of International Migration, Washington, DC
- Grisewood N, Brand S, Ruiz H et al. (2008) Best practices in preventing and eliminating child labor through education. Winrock International, Virginia
- Harkins B, Lindgren D, Suravoranon T (2017) Risks and rewards: outcomes of labor migration in Southeast Asia. ILO and IOM, Bangkok
- Hope for Justice (2020) COVID-19 and potential implications on human trafficking and other forms of modern slavery internationally. RESPECT International, Manchester
- International Centre for Missing and Exploited Children (2018) Studies in child protection: technology-facilitated child sex trafficking. International Centre for Missing and Exploited Children, Alexandria

- International Labour Organisation (1996–2017) Ratifications for Thailand. https://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO:11200:P11200_COUNTRY_ID:102843
- International Labour Organisation (1996–2023) ILO Contributions to Achieve Target 8.7. <https://www.ilo.org/global/topics/sdg-2030/goal-8/target-8-7/lang-en/index.htm>
- International Labour Organization (2018) ILO IPEC+ flagship strategy: international program on the elimination of child labor and forced labor. ILO, Geneva
- Janta H, Ladkin A (2013) In search of employment: online technologies and Polish migrants. *N. Technol Work Employ* 28(3):241–253. <https://doi.org/10.1111/ntwe.12018>
- Latonero M, Wax B, Dank M (2015) Technology and labor trafficking in a network society: general overview, emerging innovations, and the Philippines case study. University of Southern California, Los Angeles
- Mawere M (2019) Bound together in the digital era: poverty, migration, and human trafficking. In Reisen MV, Mawere M, Gebre-Egziabher KA (eds) *Mobile Africa: human trafficking and the digital divide*. African Books Collective, Oxford, p 63–90
- Mendel J, Sharapov K (2016) Human trafficking and online networks: policy, analysis, and ignorance. *Antipode* 48(3):665–684. <https://doi.org/10.1111/anti.12213>
- Movsisyan S (2019) Human Trafficking in a digital age: who should be held accountable? *Mich State Int Law Rev* 27(3):539–592
- Nedelcu M (2012) Migrants' new transnational habitus: rethinking migration through a cosmopolitan lens in the digital age. *J Ethn Migr Stud* 38(9):1339–1356. <https://doi.org/10.1080/1369183X.2012.698203>
- Nicola DA, Baratto B, Martini E (2017) Surf and sound: the role of the Internet in people smuggling and human trafficking. University of Trento, Trento
- Ong'ayo A (2019) Diaspora organisations, transnational practices, and development: Ghanaians in the Netherlands. *Thesis*, Tilburg University
- Organisation for Security and Co-operation in Europe (2020) Leveraging innovation to fight trafficking in human beings: a comprehensive analysis of technology tools. OSCE Office of the Special Representative and Coordinator for Combating Trafficking in Human Beings and Tech Against Trafficking, Vienna
- Rhodes LM (2017) Human trafficking as cybercrime. *Agora Int J Adm Sci* 1:23–29
- Servaes J (2003) Chapter 9: communication for development approaches of some governmental and non-governmental agencies. In Servaes J (ed) *Approaches to development: studies on communication for development*. UNESCO, Paris, p 1–17
- Skuse AJ, Downman S (2012). MTV EXIT ASIA III: a campaign to increase awareness and prevention of trafficking in persons. Independent Review, Department of Foreign Affairs and Trade
- Smales P (2011) The new enslaved person in the kitchen: debt bondage and women migrant domestic workers in Asia. *Asia Pacific Forum on Women, Law, and Development*. <http://un-act.org/wp-content/uploads/2016/04/The-New-Slave-in-the-Kitchen.pdf>. Accessed 30 July 2021
- Sood S, Cronin C, Sengupta A et al. (2019) Technical guidance for communication for development programs addressing violence against children. UNICEF, New York
- Stephens S (2017) Show, don't tell: how Thailand can and must make advancements in the fight against human trafficking in the Thai fishing industry. *Emory Int Law Rev* 31(3):477–503
- Sykiotou AP (2017) Cyber trafficking: recruiting victims of human trafficking through the net. In Spinellis CD, Theodorakis N, Billis E, Papadimitrakopoulos G (eds) *Europe in crisis: crime, criminal justice, and the way forward—essays in honour of Nestor Courakis*. *Ant. N. Sakkoulas, Athens*, p 1547–1587
- Uluca C, Livingston K, Pedersen A et al. (2022) 2021 Findings on the worst forms of child labor. The US Department of Labor's Bureau of International Labor Affairs. Washington, DC. http://www.chrome-extension://efaidnbmnnnibpcjpcglclefindmkaj/https://www.dol.gov/sites/dolgov/files/ILAB/child_labor_reports/tda2021/2021_TDA_Big_Book.pdf. Accessed
- United Nations Children's Fund East Asia and the Pacific Regional Office (2020) What works to prevent online and offline child sexual exploitation and abuse? Review of national education strategies in East Asia and the Pacific. UNICEF, Bangkok
- UN Development Programme (UNDP) (2011) Communication for development – strengthening the effectiveness of the United Nations. Retrieved from http://www.undp.org/content/undp/en/home/librarypage/democratic-governance/civic_engagement/c4d-effectivenessofun.html
- United Nations (2022) Global indicator framework for the Sustainable Development Goals and targets of the 2030 agenda for sustainable development. http://www.chrome-extension://efaidnbmnnnibpcjpcglclefindmkaj/https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework%20after%202022%20refinement_Eng.pdf
- United Nations General Assembly (2015) 70/1 Transforming our world: the 2030 agenda for sustainable development. A/RES/70/1. United Nations. https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E. Accessed 1 July 2021
- United Nations Global Initiative to Fight Human Trafficking (2008) 017 Workshop: technology and human trafficking. In: The Vienna forum to fight human trafficking, Austria Center Vienna. Anti-Human Trafficking Unit, Vienna, p 1–27
- United Nations Office on Drugs and Crime (2008) Toolkit to combat trafficking in persons: global program against trafficking in human beings. United Nations, New York. http://www.chrome-extension://efaidnbmnnnibpcjpcglclefindmkaj/https://www.unodc.org/documents/human-trafficking/HT_Toolkit08_English.pdf
- United Nations Office on Drugs and Crime (2013) UN crime body to combat online child abuse. UNODC. <https://www.unodc.org/unodc/en/frontpage/2013/September/un-crime-body-to-combat-online-child-abuse.html>. Accessed 1 July 2021
- United Nations Office on Drugs and Crime (2015) Study on the effect of new information technologies on the abuse and exploitation of children. United Nations, New York
- United Nations Office on Drugs and Crime (2016) Global report on trafficking in persons. United Nations, New York
- United Nations Office on Drugs and Crime (2020) Impact of the COVID-19 pandemic on trafficking in persons: preliminary findings and messaging based on rapid stocktaking. UNODC. https://www.unodc.org/documents/Advocacy-Section/HTMSS_Thematic_Brief_on_COVID-19.pdf. Accessed 1 July 2021
- United Nations Office on Drugs and Crime (2021) Global Report on trafficking in persons 2020. United Nations, Vienna
- United Nations Thematic Working Group on Migration in Thailand (2019) In: Harkins B (ed) Thailand migration report 2019. Ainergy Studio Company Limited, Bangkok
- US Department of State (2022) 2022 Trafficking in persons report: Thailand. <https://www.state.gov/reports/2022-trafficking-in-persons-report/thailand/>
- Van Dijk J, Poell T, De Waal M (2018) The platform society: public values in a connective world. Oxford University Press, Oxford
- Van Reisen M, Mawere M, Stokmans M et al. (2019) Black holes in the global digital landscape: the fueling of human trafficking on the African continent. In Van Reisen M, Mawere M, Gebre-Egziabher KA (eds) *Mobile Africa: human trafficking and the digital divide*. African Books Collective, Oxford, p 3–32
- Van Stam G (2017) Reflections: a narrative on displacement of technology and meaning in an African place. *Thesis*, Tilburg University
- Volodko A, Cockbain E, Kleinberg B (2020) “Spotting the signs” of trafficking recruitment online: exploring the characteristics of advertisements targeted at migrant jobseekers. *Trends Organ Crime* 23(1):7–35. <https://doi.org/10.1007/s12117-019-09376-5>
- Weissbrodt D, Anti-Slavery International (2002) Abolishing slavery and its contemporary forms. United Nations, New York, and Geneva
- Weitzer R (2015) Human trafficking and contemporary slavery. *Annu Rev Socio* 41:223–242. <https://doi.org/10.1146/annurev-soc-073014-112506>
- Weitzer R (2020) Modern slavery and human trafficking. *Great Dec* 41–52

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Author contributions

The author is the sole contributing author to this article.

Competing interests

The author declares no competing interests.

Ethical approval

(a) Full name of the research committee: Professor Emeritus Pramote Prasartkul, Chairman, IPSR-IRB Valid from 10 May, 2019 to 9 May, 2020. (b) The author wishes to confirm that all research was conducted in accordance with applicable guidelines/regulations when human participants are involved. For example, on 25 April, 2019, the IPSR-Institutional Review Board (IPSR-IRB) met and decided to issue the COA for the aforementioned project. COA No. 2019/04-124 is its identification number.

Informed consent

All participants provided their informed consent before the interview process.

Additional information

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