

The Role of Digital Technologies in Combating Cyber-Trafficking in Persons Crimes

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Abstract

With the increase in technological development, trafficking in persons has become one of the world's most pressing issues, with a large number of countries having been affected over the past few years. This research deals with the role of digital technologies implemented through cyberspace in detecting and combating trafficking in person's crimes. Moreover, the research clarifies the concept of cyber-trafficking, in addition to addressing the different types of cyber-trafficking in person's crimes. The research found that trafficking in persons is a serious crime because it violates human rights. In addition, the research found that the rate of trafficking has increased due to the global accessibility that the Internet has provided, posing great risks to the public and increasing the rate of cyber-trafficking crimes. Furthermore, the research found that the reasons of trafficking in persons were numerous due to the development of digital technologies at the beginning of the twenty-first century, with the most common motive being for illegal financial profit. Combating trafficking in persons has become an important political priority for many governments around the world, and any future success in eliminating trafficking in persons in its various forms will depend on the extent to which governments and relevant organizations are prepared to develop digital technologies and use them to combat and prevent cyber-trafficking crimes.

Keywords: trafficking in persons, cyber-trafficking in persons, digital technologies, cyberspace

1. Introduction

Trafficking in persons, the illegal industry and the fastest growing in the world, is present in almost every country in the world, where the phenomenon of trafficking in persons is a global phenomenon that has troubled many countries and governments; As a result of the wide spread witnessed in recent years due to many factors, including political, social, economic and technical factors, traffickers of trafficking in persons usually tend to attack people for several reasons, including psychological or emotional weakness, poverty, natural disasters or political instability (Keskin *et al.*, 2019).

The massive and accelerating development of digital technologies and the spread of communication with cyberspace may have contributed to the exacerbation of the phenomenon of cross-border trafficking, as it makes a person his goods can be exploited in various illegal methods and in violation of the teachings of monotheistic religions and international legislation. This justifies countries to mobilize with all possible combat this phenomenon.

The phenomenon of trafficking in persons has taken many forms and methods. Forced labour, slavery, modern slavery, debt bondage, slavery-like practices, forced marriage, trafficking in persons, children or sex, domestic servitude, forced prostitution, and child soldiering are all terms that describe various abusive practices that remove people's personal freedom (Mende, 2019).

The United States of America divides the many forms of trafficking in persons into two main forms: sex trafficking and forced labour (United States, 2022). According to (Meneses-Falcón *et al.*, 2019) study, trafficking in persons ranges from forced labor, sex trafficking and organ trafficking to other acts that involve power over a person through coercion, religion, or deception.

Because of technological advancements, human traffickers are no longer limited to personally recruiting their

victims; instead, they can now access an unlimited number of potential victims through digital technologies through cyberspace. Furthermore, traffickers are becoming more adept at utilizing technological advancements to both recruit and exploit victims. For example, traffickers of trafficking in persons exploit technical tools to disguise the source of communication and thus anonymize; Internet means such as social media platforms to advertise their illegal services; Smartphones with Global positioning systems (GPS) can be used to locate their victims, or traffickers can communicate with each other using encrypted data (Montasari & Jahankhani, 2021).

On the other hand, technical developments provide unprecedented opportunities for relevant organizations in countries and relevant stakeholders in the fight against trafficking to monitor illegal activities, analyze data to prosecute traffickers of trafficking in persons, and locate and rescue victims. More specifically, Big Data and AI technologies have great potential to detect emerging activities, as well as predict future activities, allowing relevant stakeholders to plan for a timely response to activities to combat them or at least mitigate their effects.

The rest of the research is organized in different sections. Next section represents the Review of Related Work. The Research Problem is highlighted in Section 3. Section 4 represents the Research Questions. In section 5, I describe the Research Objectives. Section 6 reveals the Research Importance. The Research Methodology is represented in section 7. Section 8 details the Research Plan. Final section presents the Conclusion.

2. Review of Related Work

Over the past decade, academics and stakeholders interested in the topic of trafficking in persons have searched for solutions using modern digital technologies as a means to intensify the fight against trafficking while ensuring a high level of protection for victims. Technology can have significantly diverse results when used in various contexts or under various conditions because technological advancements frequently have effects on the environment, society, and humans that go well beyond the immediate aims of the tools and technical practices themselves (Kranzberg, 1986).

The study (Szakonyi *et al.*, 2021) provided a background on trafficking in persons, and an expanded view of the use and effects of digital currency, as well as the use of machine learning to analyze groups of publicly available traffic data. The researchers carried out an analysis of a set of data, which was obtained from the Counter-Trafficking Data Collaborative (CTDC). In most age categories, the researchers discovered that women are more likely than males to become victims of human trafficking. According to the researchers, the Philippines, Ukraine, the Republic of Moldova, the United States of America, and Cambodia are the top five nations afflicted by trafficking in persons. Finally, the study makes recommendations regarding data collection, management, and analysis to help combat human exploitation.

A study (Gerry *et al.*, 2016) showed that different types of digital technologies may be effective in the context of crime prevention, investigation or prosecution, but they inevitably raise significant concerns, especially with regard to privacy and data protection. Therefore, the study identified the main terms and provisions related to privacy and data protection, and this study then revealed three ways in which advanced technologies can contribute to combating trafficking in persons, and these technologies are: Location Tracking, Data Collection, and Drones (Unmanned Aircraft Vehicles (UAVs)).

The study (Scheidt *et al.*, 2021) reviewed a variety of the most common digital forensic tools, specifically in terms of their limitations in investigating Internet of Things (IoT) devices. (HFIoTS)", as IoT forensics have proven to be efficient in investigating several cases such as trafficking in persons.

The study (Zhu *et al.*, 2019) proposed an approach based on Language Model technology and machine learning technology to identify and detect advertisements and indicators of trafficking in persons in advertisements for services provided to adults. Three key contributions were made by this study's findings. The first is that the proposed approach is superior to the deep learning approach. Second, the suggested approach generates findings that are easier to understand and offers automatic keyword detection to find and monitor probable trafficking signs. The study can also be used to identify unidentified trafficking organizations and rank them according to their trafficking risk rankings. A study (Hernández-Álvarez, 2019) examined the detection of tweets from the global communication platform "Twitter" that could be suspicious to advertise sexual services, a crime related to trafficking in persons, and to discover the tweets that may be related to this crime, machine learning technology was used.

A study (Alvari *et al.*, 2016) employed both data mining technology and semi-supervised machine learning technology, where the focus in this study is on textual information from the available data obtained from the website Backpage.com, it was determined through the proposed approach in the study whether the accompanying ads could reflect the activities of trafficking in persons, and the results indicate the success of the

proposed approach in identifying potential advertisements related to trafficking in persons.

The study (Diaz & Panangadan, 2020) presented a method for identifying sex trafficking companies through text data (comments) in public forums on the Internet. This method uses machine learning to extract patterns from words automatically, and then identify the business Illegal. The proposed method was evaluated on a set of textual data from the Yelp forum online, using a variety of machine learning algorithms and a different number of textual derivations. The method achieved an accuracy of approximately 76% on a set of text data from the Yelp forum, and this method proved to be computationally effective and can be used in practice to identify suspicious content.

3. Research Problem

The phenomenon of trafficking in persons is classified as a serious crime as it affects the human rights aspect of people, as this crime is considered one of the most illegal global crimes, an industry in itself that generates billions of dollars and affects all countries of the world. Over 45 million people are thought to be victims of trafficking in persons worldwide (Bonilla & Mo, 2019).

Trafficking in persons has expanded significantly in recent years, as most of these crimes are based in cyberspace with the massive and accelerating development of digital technologies and the spread of Internet connectivity (Volodko *et al.*, 2020).

The increasing use of digital technologies across cyberspace is creating a breeding ground for traffickers of trafficking in persons. Moreover, some of the technologies used through cyberspace help traffickers hide their criminal activities with somewhat anonymity, thus reducing the possibility of arrest by the relevant authorities.

4. Research Questions

The research problem is crystallized in the following main question: What is the role of digital technologies in combating cyber-trafficking in persons?

From the main question of the research problem, the following sub-questions are derived:

1. What is the concept of cyber-trafficking in persons?
2. What are the crimes of cyber-trafficking in persons?
3. What are the digital technologies used in cyber-trafficking?
4. What are the digital technologies used to combat cyber-trafficking in persons?

5. Research Objectives

This research clarifies the role of digital technologies in combating cyber-trafficking in persons, as the statement of this role enables stakeholders concerned with combating trafficking in persons to benefit from modern digital technologies in detecting and combating these crimes, as stakeholders in combating trafficking include local and international governments, law enforcement, academia, the technology sector, non-profit and non-governmental organizations, and finally businesses (Mayorga *et al.*, 2019).

The objectives of this research lies in the following:

1. This research clarifies the concept of cyber-trafficking in persons.
2. This research shows crimes of cyber-trafficking in persons.
3. This research reviews the most important digital technologies used in cyber-trafficking in persons.
4. This research reveals the most important digital technologies used in combating cyber-trafficking in persons.

6. Research Methodology

The research tends to follow the descriptive analytical approach, as it is the most appropriate to the nature of this research. It seeks to describe the concept of cyber-trafficking in persons and its crimes and analyze its digital technologies used in trafficking in persons, in addition to analyzing digital technologies used in combating trafficking in persons, with the aim of revealing the role of digital technologies in combating cyber-trafficking in persons.

7. Search Plan

The research was divided into fourth research studies as follows:

First: concept of cyber-trafficking in persons.

Second: crimes of cyber-trafficking in persons.

Third: digital technologies used in cyber-trafficking.

Fourth: digital technologies used in combating cyber-trafficking in persons.

These research studies will be discussed in more detail below.

7.1 Concept of Cyber-Trafficking in Persons

This research study consists of three requirements. The first requirement examines the concept of trafficking in persons. The second examines the concept of cyberspace. The third requirement shows the concept of cyber-trafficking in persons. These requirements will be discussed in more detail below.

7.1.1 Concept of Trafficking in Persons

This research defines linguistically the term “trading” for the purpose of understanding its linguistic meaning, as the term “trading” is one who trades, i.e. dealing in the markets, buying and selling for profit (Mustafa *et al.*, 1972).

The concept of trafficking in persons is defined through the Protocol to Prevent, Suppress and Punish Trafficking in Persons, especially Women and Children (United Nations, 2000), where the term means “the recruitment, transportation, transfer, harboring or receipt of persons, by means of the threat or use of force or other forms of coercion, of abduction, of fraud, of deception, of the abuse of power or of a position of vulnerability or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purpose of exploitation. Exploitation shall include, at a minimum, the exploitation of the prostitution of others or other forms of sexual exploitation, forced labour or services, slavery or practices similar to slavery, servitude or the removal of organs.”

As for the study (Cockbain & Bowers, 2019), it was mentioned that trafficking in persons is the transfer of persons, coercion or persuading them through fraud to obtain benefits from their services. Moreover, the study classified trafficking in persons into three categories:

- Sex trafficking;
- Forced labor;
- Domestic servitude.

7.1.2 Concept of Cyberspace

The term cyberspace was first used in 1982 by author William Gibson in his short story "Burning Chrome", and the term was popularized in 1984 in his novel "Necromancers". In the nineties of the twentieth century, the term cyberspace became referred to as the Internet (Mueller, 2017), and the word cyber was derived from the Latin word (Cyber), which means electronic.

The term cyberspace has no globally unified definition, the International Telecommunication Union (ITU)⁽¹⁾ defines cyberspace as: “A physical and non-physical terrain created by and/or composed of some or all of the following: computers, computer systems, networks, and their computer programs, computer data, content data, traffic data, and users.”

Cyberspace plays an essential role in trafficking in persons, as cyberspace is used by traffickers to carry out their heinous crimes, by reaching a large base of people in different locations around different regions of the world. This leads us to clarify what is meant by the concept of cyber-trafficking in persons in the third requirement below.

¹ The United Nations specialized agency in the field of information and communication technology.

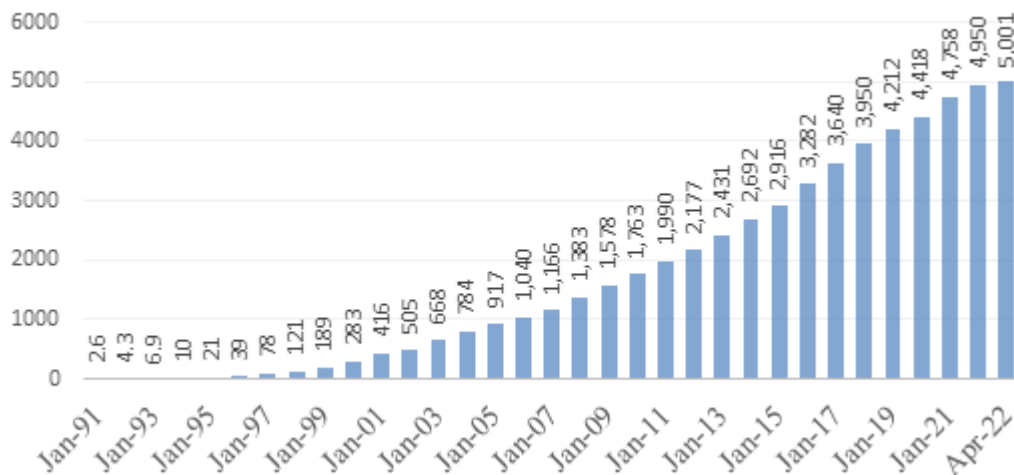


Figure 1. Number of Internet users worldwide in billion from January of the year 1991 until the month of April of the year 2022. (Source: We Are Social & Hootsuite, 2022)

7.1.3 Concept of Cyber-Trafficking in Persons

At the outset, author likes to point out that what is meant in this research by the term cyber-trafficking in persons is trafficking in persons through cyberspace, as the crime of trafficking in person dependent on cyberspace would not be possible without the global Internet and modern digital technologies. These crimes are facilitated by the significant increase in the number of Internet users, as a recent report entitled “Digital 2022: The Global Statistical Report for the month of April” revealed that the number of Internet users in the world reached 5.001 billion people, as this statistical figure represents about 63% of the world’s population (We Are Social & Hootsuite, 2022). This number is still increasing with the continued development of digital technologies. Figure (1) shows the number of Internet users worldwide from January of the year 1991 until the month of April of the year 2022.

Although advanced digital technologies, especially the Internet, have increased the opportunities for use, where it is widely observed that deep immersion in online activities, such as games and social media platforms, which poses great risks to people and multiply the violations and harms they actually face on the ground (Wall, 2007). These technologies have opened modern channels for human trafficking through cyberspace.

There are many methods used by traffickers of trafficking in persons to announce and exploit their victims, the most common of which is advertising via the Internet, specifically through social media platforms, where mobile devices connected to the Internet are widespread, and most of the traffickers use them to increase their work in the field of trafficking in persons (Konrad *et al.*, 2017). In the past 30 years, traffickers of human trafficking have abused advanced digital technologies to support in their exploitation of their victims by forcing them into sex and labor (Richmond, 2019).

Given that there are already more than 4.2 billion social media users globally, people's lack of understanding about cyber-trafficking in persons, along with the growth of digital technology and social media platforms, has made it easier for more people to be exploited as victims. The large number of users of social media platforms allows traffickers of trafficking in persons to recruit and exploit victims that they would not have been able to reach before (Kemp, 2021).

Based on what was previously mentioned in the first requirement (the concept of trafficking in persons) and the second requirement (the concept of cyberspace), we can define the concept of cyber-trafficking in persons as: the illegal violation or exploitation directed against individuals in person through the use of digital technologies associated with cyberspace.

7.2 Crimes of Cyber-Trafficking in Persons

The use of cyberspace in the past years has greatly expanded the ability of criminals to traffic in persons, as modern digital technologies have provided a new dimension to crime, and crime has become committed with the latest digital technologies and through global Internet networks “cyberspace”, where social media platforms allow traffickers of trafficking in persons and clients by identifying potential victims worldwide as ‘phishing’, which facilitates crime (Bach & Litam, 2017).

The spread of phishing through cyberspace is due to the fact that traffickers of trafficking in persons and clients are trying to keep themselves anonymous, whether to prevent disclosure of the fact that they committed the crime or to avoid arrest. Moreover, cyberspace enables trafficking offenders to exploit victims to exchange money through crypto currencies, thus obscuring their illicit activities, as cryptographic techniques allow people engaged in illicit activities to make payments in a way that is difficult to trace, reducing the risk of locating offenders (Lukianchuk *et al.*, 2017), the International Labor Organization (ILO) has estimated that traffickers of trafficking in persons reap \$150 billion in profits each year, of which \$99 billion is generated from exploiting sexually. In other words, the largest and most lucrative form of trafficking in persons is sex trafficking (ILO, 2014).

Social media platforms are useful for illegal actions because of their mechanisms, which enable quick responses and instantaneous communication. The rapid pace of communication has enabled traffickers to easily communicate with customers interested in purchasing an exploitative service (UNODC, 2021).

Paradoxically, the Internet makes trafficking in persons more apparent and less obvious. However, because the majority of illegal activity in this area involves real individuals, the majority of trafficking criminals cannot remain hidden forever behind their screens (YU, 2014).

There are many forms of trafficking in persons through cyberspace, as it takes several methods and forms criminalized by international legislation, which has led to a continued rise in the number of victims of trafficking in persons. Some countries of the world have enacted legislation on combating information crimes, and included the crime of trafficking in persons within the crimes of modern digital technologies, and monitored appropriate penalties for them. Among these legislations:

- The Law of Anti-Cyber Crime in the Kingdom of Saudi Arabia, where the law was issued pursuant to Royal Decree No. M/17 dated March 27, 2007.

Moreover, the United Nations called upon member states to cooperate in law enforcement through modern technologies, as described in the agreement below:

- The United Nations Convention against Transnational Organized Crime, which was adopted on November 15, 2000.

Some countries of the world have enacted conventions and charters on trafficking in persons, and among these conventions and charters are:

- The American Convention on Human Rights, the Convention was adopted by many countries of the world on November 22.
- The Arab Charter on Human Rights, where the charter was adopted at the sixteenth Arab summit on May 23, 2004.

The adoption of conventions or charters at the regional or international level to combat human trafficking crimes is a cornerstone, but the actual adoption is their procedural implementation in reality at the local level, especially since the crimes of trafficking in persons represent a challenge to the stakeholders involved in combating trafficking in person's crimes (Alhargan, 2020).

It is worth noting that the crimes of trafficking in persons in general, do not come through a single method or form, but rather take multiple methods and forms (Mende, 2019; Burke, 2022), among which we mention:

- Forced labor (discussed in some detail later).
- Slavery by lineage.
- Bonded labor, sometimes known as debt bondage.
- Early or forced marriage.
- Sex trafficking (discussed in some detail later).
- Domestic servitude, sometimes known as involuntary household servitude.
- Child trafficking.
- Child recruitment.
- Trafficking in persons' organs.

The United States of America divides forms of trafficking in persons into two main forms: sex trafficking and forced labor (United States, 2022), and accordingly, in this research, "sex trafficking" and "forced labor" will be

addressed in some detail in this research.

7.2.1 Sex Trafficking

An extremely painful form of trafficking in persons for the purpose of commercial exploitation by force, fraud or coercion, sexual exploitation is the most common form of trafficking in persons, accounting for approximately 79% of the illicit trade (UNODC, 2009). From an academic point of view, more study has been conducted on sex trafficking than on all other types of trafficking combined over the past 20 years. This is due to the current literature on sex trafficking's diversification. (Grubb, 2020).

Potential victims of sex trafficking are diverse, drawn from multiple ethnic groups and cultural backgrounds. While victim recruitment is greatly affected by difficult family conditions, low education, and lack of positive social ties, instability in the economy and poverty rank among the most important issues (Logan *et al.*, 2009).

Children, women and even men can become victims of sex trafficking, though women make up the vast majority of these victims. Traffickers win the trust of potential victims by building a relationship and providing presents, which is one of the most widely used recruitment strategies today (Kotrla, 2010).

Moreover, a study (Deshpande & Nour, 2013) found that potential victims receive a wonderful job, a happy marriage, or an education from sex trafficking offenders to lure victims. Regarding the length of time traffickers spend caring for victims, (Thorn, 2018) indicated that it often took traffickers 4 months to win the trust of their victims. On average, sex trafficking victims are exploited for 23 months (ILO, 2017). The study (Chatzis *et al.*, 2020) indicates that women play a major role in trafficking in persons not only as victims, but also as traffickers.

Children are also more likely to become victims of trafficking because they are more likely to be credulous and trust strangers online (Lewis & Llewellyn, 2019), spend more time on social media platforms than older users and are more likely to divulge personal information to those who engage in human trafficking. They are easy targets for exploitation due to their readiness to divulge personal information to online traffickers. According to the National Center for Missing & Exploited Children (NCMEC), "Most traffickers now recruit children online through modern digital technologies (including but not limited to: applications and platforms and social communication) and use the information obtained through these technologies to communicate with children and build trust with them faster" (NCMEC, 2019).

7.2.2 Forced Labour

Forced labor is one of the forms of trafficking in persons that is on the rise and has become the dominant form of exploitation in many countries of the world. Forced labor takes different forms and takes place in various sectors of the state. Often the victims are migrant workers who are particularly vulnerable to exploitation due to their lack of integration into society and also because of immigration policies in the concerned country (Lingaas, 2022). According to (ILO, 2017), nearly 25 million men, women and children were forced to work under threat or duress in 2016.

There is no consensus on the definition of forced labor. International labor legislation, international criminal laws and human rights laws have attempted to establish a framework for the concept of forced labor. The International Labor Organization (ILO) defined forced labor as: "all work or service which is exacted from any person under the threat of a penalty and for which the person has not offered himself or herself voluntarily" (ILO, 1930). It is clear from this definition that forced labor represents a restriction on human freedom, a violation of human rights, and the complete opposite of "decent work" or "human development" (Belser, 2005).

Modern digital technologies have become an integral part of supporting labor trafficking in the twenty-first century (Latonero *et al.*, 2015). A study (Christ & Helliard, 2021) used Blockchain technology as a key component to provide documentary evidence in order to protect workers from exploitation, forced labor, and modern slavery. This was made possible by its ability to record and provide an auditable path of transactions associated with it. With regard to employment-related matters including employment contracts, immigration information, passports, and visa arrangements, technology can be a useful weapon in the fight against modern slavery (forced labour).

7.3 Digital Technologies Used in Cyber-Trafficking

In light of the tremendous and accelerating progress witnessed by the countries of the world recently in the field of digital technologies, which have become an integral part of the daily life of all spectrums of societies, which in turn has been reflected in the increasing use of the global Internet, however, it poses new security challenges, both at the level of governments and at the level of people where cybercrime researchers have studied how the capabilities of digital technologies can facilitate crime (Goldsmith & Wall, 2019).

The study (Landron, 2021) aimed to determine how digital technologies have promoted trafficking in persons to become the third largest secret crime in the world. This study examined the press articles of the five largest newspapers in the United States of America, starting from the eighties of the last century until the present, to explore the relationship between technical developments and the emergence of trafficking in persons, and the results showed that articles containing technical and trafficking terms are clear and increase with time. A total of 948 articles from the 1980s were found. With a total of 13,844 articles in the 1990s, this increased significantly. It then increased even more in the 2000s, reaching 89,186 articles. Finally, during the second decade of the twenty-first century, the total reached its pinnacle with 19,854 items. In this decade, 33,209 items have been discovered, with the assumption that this will increase by 2029. The study concluded that the techniques were harmful in the growth of trafficking in persons.

Digital technologies have also facilitated channels through cyberspace for trafficking in persons' operations, which have enabled traffickers of trafficking in persons to locate, recruit, coerce and control their victims (Gerry & Shaw, 2019). Four stages are covered by the technology employed by traffickers: victim recruiting, victim transportation and exploitation, and the management of the ensuing illicit revenues (Aronowitz, 2009). In each of these stages, traffickers use digital technologies to facilitate their work, which facilitated The global Internet (cyberspace) and smartphones in the creation and operation of international organized crime networks that have no geographical boundaries (Brewster et al., 2014). Based on this, I will address in this research two digital technologies that can be used to reach and exploit potential victims, and these two technologies are: social media platforms spread across cyberspace and smart phones.

7.3.1 Social Media Platforms

Social media platforms are a form of communication, which is through the global Internet "cyberspace", where social media platforms allow people to share information and create content, whether the content is written, visual or audio, and there are many communication platforms, for example not Limited: Twitter platform, Facebook platform, Snapshot platform, Instagram platform, and other platforms spread across cyberspace. (Thorn, 2018) reported that 90% of victims of sex trafficking have accounts on social media platforms.

Nowadays, the trafficking in persons uses social media platforms through cyberspace to advertise sex trade, which is committed under the threat of use of force, fraud or coercion, the fight against sex trafficking has become more difficult in recent decades as it has shifted from the streets to covert classified advertising on the Internet (Wiriyakun & Kurutach, 2021).

Social media platforms have become a transnational phenomenon, and the reason for this is due to the information revolution brought about by digital technologies, so that platform applications have become accessible to almost all people, and the details of a large part of people's data have become exposed and anyone can view this data, which represents a danger threatening the security of users' personal data (Al-Khaikani & Khalaf, 2021).

A recent report entitled "Digital 2022: The Global Statistical Report for the Month of April" revealed that the number of users of social media platforms in April of the year 2022 reached approximately 4.65 billion users, as this statistical figure represents about 58.7% of the world's population. It is expected that the number of users of social media platforms will increase in the coming years (We Are Social & Hootsuite, 2022). Figure (2) shows an increase in the number of users of social media platforms from April of the year 2020 until the month of April of the year 2022.

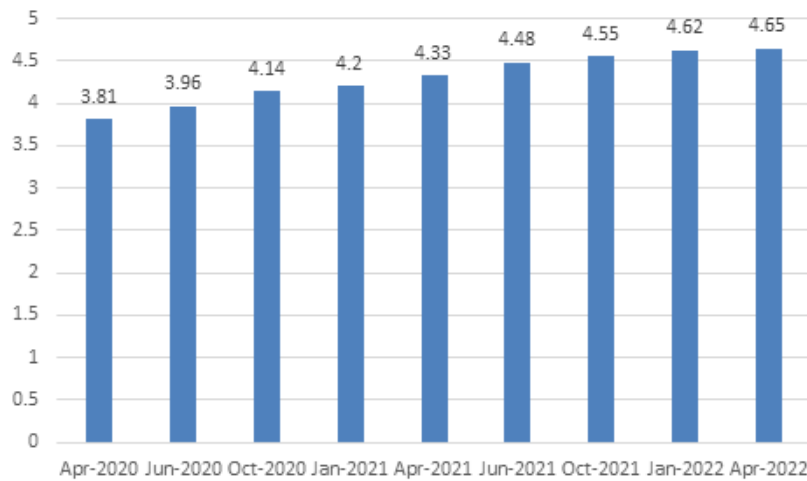


Figure 2. Number of users of social media platforms in billion from April of the year 2020 until the month of April of the year 2022. (Source: We Are Social & Hootsuite, 2022)

As a result of the massive increase in people using social media platforms, platforms have played a major role in the spread of human trafficking (Grubb, 2020). It is worth noting that the social media platforms spread across cyberspace and hosting trafficking operations are many and varied. Unlike what most people think, the vast majority of trafficking is not hidden on the Dark Web or other secret websites, but rather in plain sight on the World Wide Web and on many classified and popular websites. A study (Maras, 2017) stated that traffickers sell their victims through websites via the Internet (cyberspace), which are easily accessible to the largest number of customers, and many of these customers may not be technically savvy.

On the other hand, the study (Terwilliger, 2021) demonstrated the role that social media platforms play in attracting potential victims of trafficking in persons, and identifies the precautions that potential victims of trafficking in persons can take regarding their use of social media platforms.

7.3.2 Smart Phones

Smartphone technology has revolutionized the way we communicate, which has been adopted more widely than any communication technology in history. The rapid spread of digital technologies such as smartphones connected to the internet has provided significant benefits to society and has also revealed new pathways and opportunities for exploitation (Sarkar, 2015).

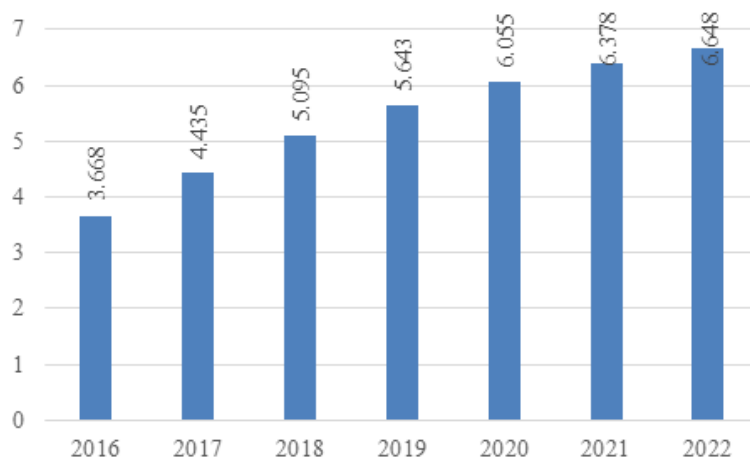


Figure 3. Number of smartphone users in billion from 2016 to the present. (Source :Statista, 2022)

According to (Statista, 2022), there are currently 6.648 billion smartphone users worldwide, meaning that 83.72 percent of the world's population is in possession of a smartphone. This number rises significantly from 2017, when there were only 4.435 billion users, 49.40% of the world's population in that year, Figure (3) shows an increase in the number of smartphone users from 2016 to the present.

The increasing number of smartphone use has enabled traffickers to reach larger clients because they can arrange more sexual interactions for each child (U.S. Department of Justice, 2010). Smartphones can also be used by traffickers to track the movements of their victims and control their actions. Smartphones allow geo-tracking, which is “the ability to determine a person’s current physical location by obtaining GPS data from their smartphone” (PCMAG, 2021). Also, some modern digital technologies (for example, MySpy application) allow traffickers to monitor the smartphones of their victims (Johnson, 2017).

The increasing criminal use of digital technologies by traffickers of trafficking in persons opens the door to new legal strategies to prosecute these traffickers (Chen & Tortosa, 2020), and modern digital technologies can also be used to reduce criminal uses, and this will be discussed in some detail in Fourth topic.

7.4 Digital Technologies Used in Combating Cyber-Trafficking in Persons

The tremendous technical development that we are witnessing now contributed to the production of many modern digital technologies that had a significant and effective role in various fields, and these technologies became of great importance in the lives of all societies. Stakeholders involved in the fight against trafficking in persons may find that digital technologies are very important tools at their disposal, as these technologies offer many benefits such as tracking and diagnosing crimes through the combination of data and artificial intelligence.

Over the past ten years, academics, activists, and policymakers have repeatedly urged an investigation into the contribution of digital technologies to trafficking and exploitation, with attention given to a number of issues centered around the use of social media and adult websites for victim recruitment and trafficking facilitation, as well as using software to analyze data in order to learn about trafficking and locate the “risk hotspot” (Musto *et al.*, 2020).

The fight against trafficking in persons can be framed in four types of actions: prevention, protection, prosecution and partnership (Konrad *et al.*, 2017). Each of these types requires resources; thus, analytical methods can be useful to guide anti-trafficking decision-making.

Most countries in the world in general are making unremitting and continuous efforts to combat trafficking in persons (USA, 2021). To stop the growth of trafficking operations through cyberspace, numerous governmental and non-governmental organizations, private businesses, and other groups are developing technologies. This paper describes two key digital technologies that organizations and relevant stakeholders can use to more effectively combat trafficking in persons. This study consists of two requirements; the first requirement: Big Data, and the second requirement: Artificial Intelligence.

7.4.1 Big Data

Before delving into the clarification of the concept of big data, it is necessary to address the clarification of the concept of data, as data is referred to as a set of texts, numbers, and symbols without any meaning. Therefore, data must be processed before it can make sense, as information is formed through the processing of raw data.

Data plays a more central role than ever in organizations, as the rapid growth of media, digital devices, and software applications has provided organizations with unprecedented opportunities to leverage data (Wedel & Kannan, 2016). In the context of crime control, big data may offer data-driven knowledge, enabling the detection of meaningful patterns by identifying links between various crime indicators and facilitators. As a result, the capacity to recognize patterns in data offers hope that worthwhile insights from big data might be retrieved and then communicated to decision makers and other stakeholders to combat crime (Larsen, 2017).

Recently, researchers and stakeholders have been interested in the concept of big data, and its definitions have varied. It has been defined by the International Telecommunication Union (ITU, 2018) defines it as: “A paradigm for enabling the collection, storage, management, analysis and visualization, potentially under real-time constraints, of extensive datasets with heterogeneous characteristics.” As defined by (Matthias *et al.*, 2017) as: “data-sets whose size is beyond the ability of typical database software tools to capture, store, manage and analyse.”

Big data can combat trafficking in persons, by analyzing the data provided by databases and transforming them into information to generate new perceptions and ideas that benefit relevant stakeholders in curbing trafficking in persons. The analysis of big data from social media platforms spread across cyberspace is one of the most important tools in combating trafficking in persons, given that social media platforms are data miners, through which information is extracted. To discover patterns of trafficking in persons’ crime for the benefit of relevant stakeholders in the fight against these crimes, the Counter-Trafficking Data Collaborative (CTDC) is the first global data association on trafficking in persons, which publishes coordinated data from anti-trafficking

organizations around the world.

A commendable digital technology used for big data technology (STOP application) is the first global digital “application” technology, which combines community empowerment, big data management and the expertise of relevant anti-trafficking stakeholders to combat and prevent trafficking in persons. All information shared with the application is entered directly into the intelligence-led prevention hub, where it is analyzed along with global data on trafficking in persons. This data is used to build intelligence on global trends and trafficking hotspots, enabling organizations around the world to stop trafficking in persons and prevent and predict this criminal activity (Stop the Traffik, 2022).

7.4.2 Artificial Intelligence (AI)

The term artificial intelligence was first mentioned in 1955, and artificial intelligence was known at the time as: “the science and engineering of making intelligent machines” (McCarthy et al., 2006). In our time, specifically with the beginning of 2018, this technology has begun to grow clearly in various fields, as artificial intelligence technology is one of the branches of computer science, as well as one of the main pillars on which the manufacture of modern technologies is based. The term artificial intelligence usually refers to the ability of computers or technical machines to learn and solve problems that mimic the functions associated with the human brain.

There are several definitions developed by a group of computer scientists for the term artificial intelligence technology, as (Bellman, 1978) defined it as: “the automation of activities related to human thinking, such as decision-making, problem-solving, and learning...” As defined by (Kurzweil *et al.*, 1990) as: “The art of creating machines that perform functions that require intelligence when performed by people.” And defined by (Luger & Stubblefield, 1993) as: “The branch of computer science that is concerned with the automation of intelligent behavior.”

Artificial intelligence has several branches, and one of these branches is the so-called machine learning, where the machine becomes able to learn with complete independence, and is also able to absorb all matters in the surrounding environment and make the appropriate decision, through algorithms that make it able to discover patterns based on the data presented and use them in the future in Decision making and predictions. Later, what is known as deep learning emerged as a part of machine learning and aims to make machines mimic the human mind.

Given the importance of combating cyber-trafficking in persons, it is necessary to take into account everything new in the world of digital technologies, and what is new here are the applications of artificial intelligence so that stakeholders concerned with combating trafficking in persons can employ and invest these applications in the aspects of combating work, and in a manner that enables them to face future challenges; Where machine learning technology can develop digital techniques “applications” to search for missing children, by matching the images of exploited children with a database of children that are missing. With this type of technology, stakeholders in the fight against trafficking in persons can assist exploited children in just seconds instead of days when such digital technologies are not used (ICAT, 2019).

One of these digital technologies is Traffic Jam, the technology uses facial recognition tools - one of the subsets of artificial intelligence - to help find the victim's image by matching it with a missing person announcement or with an advertisement on social media platforms, and knowing whether the victim's face appears in these advertisements (Burke, 2022). Data from this technology has saved hundreds of victims of trafficking in persons in the USA and Canada with a success rate of approximately 88% (Beatrice, 2021).

Also, anti-trafficking stakeholders can use Natural Language Processing, Robotic, and Pattern Recognition, which are subsets of Artificial Intelligence (Russell & Norvig, 2021), to tackle trafficking people more efficiently.

Artificial intelligence technology provides unprecedented possibilities in the areas of control, verifying the identity of people and combating crimes based on the analysis of big data (Bouderbala & Toumi, 2021).

Digital technology (Spotlight) uses predictive analytics to identify victims of child sexual abuse and trafficking. Moreover, by analyzing cyber-trafficking activities and data collected from sexual ads and ad-linked websites, it also identifies potential victims of trafficking in persons. Currently, this technology is used by the US federal government to solve complex child trafficking cases, and this AI-based technology has helped identify more than 14,000 child trafficking victims in the past four years (Beatrice, 2021).

8. Conclusion

Through this research, the role of digital technologies in combating cyber-trafficking in persons was addressed, as the following conclusion was reached:

- Cyber-trafficking in persons is a global phenomenon that troubles many countries and governments, and these crimes have increased significantly over the past years as a result of the increasing use of modern digital technologies.
- The increasing use of the global Internet (cyberspace) has led to a significant increase in trafficking in persons' activities.
- People, whether they are men, women or children, are considered a commodity that is traded through cyberspace between the traffickers of trafficking and the customers, making illegal profits.
- Traffickers of cyber-trafficking in persons prominently rely on social media platforms to recruit and exploit victims.
- Organizations and stakeholders involved in combating cyber-trafficking crimes have sought to use digital technologies to counter trafficking crimes.
- Big data and artificial intelligence technologies have made great progress in combating cyber-trafficking in persons.

Based on the aforementioned conclusion that summarized the research, digital technologies can be part of the problem as traffickers of trafficking in persons can use digital technologies to expand their criminal activities. On the other hand, digital technologies can also be part of the solution as they are used to detect, intercept and pursue cyber-trafficking in persons and assist victims.

Combating the phenomenon of cyber-trafficking in persons can benefit a lot from rapidly developing digital technologies. Based on the conclusion, I recommend the following:

- Taking the initiative to take advantage of all forms of digital technologies to raise the awareness of all societies about the dangers of cyber-trafficking through the creation of extensive advertising campaigns.
- Taking the initiative to take advantage of all forms of digital technologies to monitor the activities of trafficking in persons through cyberspace, such as monitoring the advertisements of social media platforms and related to cyber-trafficking in persons to combat them.
- It is necessary for organizations and stakeholders concerned with combating cyber-trafficking in persons to keep abreast of the latest developments in digital technologies in order to combat and prevent these crimes.

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