

Acar, Kemal Veli

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Child abuse materials as digital goods: why we should fear new commercial forms

Kemal Veli Acar

Abstract

Psycho-sociological and legal aspects of online child sexual abuse such as criminalization, offender profiling, and rehabilitation have been thoroughly studied in the literature. The economics of the issue may appear relatively insignificant at first sight, considering the devastating effects on victims. However, understanding the child abuse materials' economic value better is crucial for developing more effective crime prevention strategies particularly for emerging threats, since the disruption of an illicit market is closely related to the perceived value of such materials. Even for relatively traditional methods like membership-only commercial websites, law enforcement responses do not appear to recognize the economic facts of child abuse materials as digital goods. Similar to the legal actions taken against conventional forms of crime, law enforcement agencies preferred to take down the markets of such materials. Thus, they diminished the demand and supply of child abuse materials by shutting down online platforms and apprehending the abusers. However, in line with technological advances, new ways of offending have emerged that make these measures almost useless. Specific characteristics and dangers of these emerging threats from an economic perspective seem underestimated or completely ignored. This paper aims to analyze the economic aspect of online child abuse materials as a type of digital goods, and it discusses how new forms of commercial sexual exploitation such as crowdfunding and webcam child prostitution challenge the widely accepted policies on the fight against online child sexual abuse.

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Keywords Online child sexual abuse, commercial sexual exploitation, child abuse materials, crime prevention, policy making, crowdfunding, webcam child prostitution

Authors

Kemal Veli Acar, ✉ Department of Cybercrime, Turkish National Police, Turkey,
kemalveli.acar@egm.gov.tr

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1. INTRODUCTION

Before the Internet age, child abuse materials (CAMs) were more difficult to obtain, more dangerous to possess and harder to store in large quantities (Taylor and Quayle, 2003: 8-9). Additionally, compared to their digital equivalents, copying of magazines and videotapes led to a decrease in quality of original materials. Largely due to limited number of suppliers, scarcity of such new and high quality materials resulted in the formation of a relatively profitable illegal market. Although some defined the commercial trade of child abuse materials as “cottage industry” (Akdeniz, 2016: 6), estimations of the market size reached multi-million dollars at the end of 1970s (Adler, 2001). Demand and supply generally met in a few conditions such as adult bookstores and through mail-order system (Jenkins, 2001: 40). Since there is almost no alternative way that demand and supply could meet at that time, disruptive law enforcement responses targeting such places and processes had created positive effects rapidly and remarkably. Through the 1970’s and 1980’s, commercial trade of CAMs were greatly dwindled by successful police operations (Ferraro and Casey, 2004: 11).

Advent of the Internet introduced new and more resilient market conditions for CAMs where demand and supply can meet with greater anonymity and perpetrators have easier access to relevant online platforms. Additionally, increasing availability of data storage options such as larger yet cheaper hard disks and cloud storage made the possession of greater amount of CAMs effortless. In terms of providing reliable and sustainable market conditions for the parties of exchange, cyberspace was much more secure than its predecessor. Understandably, trade and exchange of online CAMs proliferated in the beginning of world wide web era. (Wortley and Smallbone, 2012: 25). It was estimated the industry of online CAMs reached several billion dollars annually at some point (Richards and Calvert, 2007). As a notorious and highly publicized example, Landslide productions which sold subscriptions to websites offering child pornography was taken down in 2001. The monthly profit of the company was 1.4 million dollars and it had more than 300,000 subscribers in 60 countries (Taylor and Quayle, 2003: 25; Broughton, 2009). Then, law enforcement agencies (LEAs) took more effective action against commercial websites and several successful international police operations followed suit (Krone, 2005). Similar to the legal measures against traditional crimes, LEAs preferred to take down online markets. And thus, they diminished the demand and supply by shutting down websites and apprehending the abusers (Hutchings et al., Undated). This decision was highly effective at that time since the related malicious websites were DNS-based (Domain Name Server) and subscribers usually paid for the content by credit card. LEAs of the country where hosting provider of such websites is located could issue a warrant and seize the whole data regarding illicit activities. Then, the forensic examination of seized data could reveal the IP addresses and payment information of subscribers. Today, for such reasons, commercial sexual exploitation of children in the cyberspace is not

considered a serious threat as it was before (European Financial Coalition against Commercial Sexual Exploitation of Children Online, 2010: 5; International Centre for Missing and Exploited Children, 2016: IV).

However, technological advances have given rise to new online threats to children and former successful methods of LEAs have become nearly obsolete at disrupting commercial sexual exploitation in cyberspace. Firstly, online environments called Darknet including The onion router (TOR) network, Invisible Internet Project (I2P) and Freenet appeared and have gained enormous popularity within criminal communities, drug trafficking in particular (Haughey et al., 2016; Europol, 2016: 47-48). Unlike centralized DNS-based websites, these decentralized and anonymous networks can be accessed by means of special software and security of their users is strengthened by additional features like extra layers of encryption. Therefore, shutting down or even detecting the true location of a hidden website and seizing the incriminating digital evidence have become very challenging tasks for LEAs. In recent years, mostly through undercover operations, infamous TOR hidden websites like Silk Road were taken down. Yet, since the demand and supply for illegal goods remained intact after the closure of such online environments, it didn't take long for new hidden services to fill the gap quickly with a more resilient design (Buxton and Bingham, 2015). Secondly, decentralized crypto-currencies took the place of centralized payment options as the most preferred currency in Darknet (Brown, 2016). Bitcoin, the undisputed king of crypto-currencies, relies on a distributed database called blockchain which functions as a shared public ledger. Unlike traditional payment methods, no central authority is involved in the transactions. Bitcoin addresses of all transactions appear at the blockchain but owners of those addresses are not explicitly identified (Nakamoto, 2008). Therefore, it is not quite possible to track the seller and buyer in case Bitcoin or any other similar crypto-currency is used. Thankfully, in Darknet, there has not been any hidden websites which applied the successful methods of illegal markets to the commercial trade of CAMs. However, it does not mean that such marketplaces wouldn't emerge in the future. Besides Darknet and Bitcoin, specifically for online commercial sexual exploitation of children, new and more perilous faces emerged such as webcam child prostitution and crowdfunding which will be explained thoroughly in the following sections.

Compared to the psycho-sociological and legal aspects of sharing and trading online CAMs (Schell et al., 2007), economics of the issue seems underestimated or completely ignored. However, it is important to gain a better insight into the economic aspects to create more effective policy decisions, particularly for emerging threats. In this respect, this paper puts its focus on the economic attributes of online CAMs as digital goods. It also discusses how the new types of commercial sexual exploitation such as crowdfunding and webcam child prostitution challenge the widely accepted policies and legal measures of LEAs in the fight against online child sexual abuse. In this respect, it aims to raise awareness on the economic attributes of these offences so that required policy making decisions may be taken into consideration accordingly before they

proliferate in quantity and their severity increases in quality. Such a refined knowledge also will help law enforcement to correctly assess the risk and prioritize future emerging online threats to children.

2. LITERATURE REVIEW

Previous research implicitly defines CAMs as a type of digital goods without naming them specifically and elaborating their distinctive features. However, information goods and subsets of it such as digital and virtual goods have been of great scholarly interest since the beginning of the Internet age, particularly for business and marketing purposes (Smith et al., 2001). Although these terms are generally used interchangeably, there are distinctive attributes that need to be emphasized. Besides pre-digitization aspects such as knowledge and know-how (Bates, 1990), information goods have also become an umbrella term for every digital commercial material which consists of 0's and 1's (Quah, 2003). In the first years of the Internet, nearly all the available digitized information goods had also their respective physical equivalents. For example, mp3 file or e-book is actually the digital equivalent of a compact disk or hardcover book. However, with the particular help of online gaming industry, there emerged a new type of information goods which derives its value within a certain online environment and does not have a direct physical equivalent (Hamari and Lehdonvirta, 2010). For instance, items and characters of a Massively Multiplayer Online Role-Playing Game (MMORPG) can be traded between the players. Nevertheless, it is impossible to use and exchange items and characters out of the context of the relevant online environment. To distinguish these similar concepts, they are called as digital goods and virtual goods, respectively (Liu, Undated).

Adam Smith implicitly described three essential attributes of goods to be traded effectively in a free market on his legendary book titled "Wealth of Nations": excludability, rivalry and transparency (DeLong and Froomkin, 2000). Excludability simply refers to the concept where a seller can leave out free-riders and only sells the goods to the buyers who are willing to pay for them. Rivalry means that repetitive consumption of the same good is impossible. Excludability and rivalry are close features which depend heavily on the tangible nature of physical goods. On the other hand, transparency is basically about the knowledge level of sellers and buyers on goods and trade. When the parties have all the related information about the conditions of trade, there will not be an informational asymmetry and disequilibrium in the market. However, digital goods challenged these essential features, excludability and rivalry in particular. It is possible to reproduce the digital goods with negligible costs and without a loss in quality. After the first unit of a digital material is out, it more resembles to a public good as the users reproduce and share perfect copies (Rayna, 2008). Further research revealed additional attributes of digital goods such as infinite expansion, discretion, aspatiality and recombination (Quah, 2003).

These fundamental differences of digital goods, combined with increasing broadband Internet penetration and positive attitude towards sharing digital materials throughout cyberspace, have led to an expansion of piracy (Belleflamme and Peitz, 2010). Today, there are numerous ways and online places to distribute digital goods such as peer-to-peer networks and cyberlockers (Marx, 2013). To prevent or at least minimize this undesired spillover, producers of legal digital goods have executed several legal and technical measures. Intellectual Property Rights (IPR) protection, the most important legal right for copyright holders in practice, might also hinder the unauthorized production and distribution of legal digital goods to some extent (May and Sell, 2006: 37). However, since the unauthorized downloaders of such goods sometimes can reach millions, it is neither practical nor desirable to enforce IPR law thoroughly and punish every offender (Rayna, 2007: 48). Therefore, IPR-related legal actions generally target popular online environments in which the distribution of pirated materials have been greatly facilitated and/or encouraged. In this vein, operational efforts targeting Napster, Kazaa and recently PirateBay hit the headlines. However, since the demand for free digital materials still strongly persists, either new ways or new online platforms emerge or old pirates find new ways to become more resilient. Compared to the IPR law, technical measures against unauthorized distribution of digital goods have proved less efficient. The primary aim of such measures which are also known as Digital Rights Managements (DRM) in general is to prevent unauthorized use of digital goods by implementing embedded technological obstacles such as encryption and watermarking (Liu et al., 2003). However, since it is mostly just a layer of algorithm on digital goods, DRM is only temporarily effective until offenders find a technical way to remove them (Sudler, 2013). Theoretically, high production costs and nearly unstoppable online piracy should push companies into bankruptcy. However, despite this bleak outlook, firms still continue to produce and make hefty profits.

3. CHILD ABUSE MATERIALS AS DIGITAL GOODS

Albeit outdated, online CAMs still can be transferred to the physical mediums such as DVDs and books. In this regard, it is reasonable to classify CAMs as an illegal type of digital goods since they have tangible equivalents that can be sold separately in offline environments. Inevitably, CAMs share essential attributes of legal digital goods and suffer the same drawbacks of them extensively. Like music albums, films and e-books, it costs much to produce the first unit yet it is cheaper to produce second unit even without facing a loss in quality. As previously mentioned, legal and technical measures may be introduced at this point to prevent the unauthorized reproduction and distribution of legal digital goods. Thus, the process of digital goods to turn into public goods can be delayed in a way that the profitability of such legal goods may last more (Rayna, 2007: 22). Luckily, commercial traders of CAMs have never had and certainly will not have similar lawful shields for their activities. In addition to insufficient legal protection, new

DRM methods are completely out of question for abusers since it requires expensive research and development efforts to innovate. Furthermore, bundling and renting of digital goods can also be chosen as a marketing strategy to maximize the profit (Bakos and Brynjolfsson, 1999; Varian, 2000). However, the success of such additional methods also heavily relies on strong enforcement of IPR law and effective implementation of DRM. Lastly, piracy behaviour is rampant among the downloaders of CAMs for the reasons a little different than the pirates of legal digital goods. Since the beginning of the Internet, child abusers have basically considered themselves as a community of misunderstood castouts. Besides anti-forensic recommendations and psychological support to members, sharing CAMs in online environments also have been a way of contributing to community, not a method of making money (Durkin, 1997; Estes, 2001). Simply put, commercial trade of online CAMs contradict the core values of this communal group which has a strong tendency not to sell the abusive images they create or possess. Additionally, since the members of this heinous community have tighter relationships, it is possible to buy separate CAMs by turns and decrease the profit of a potential seller remarkably, even to the extent of failure.

Ironically, the biggest obstacle for a commercial trader appears to be the potential buyers of CAMs and their general attitude towards selling CAMs in cyberspace. In support of this argument, the reasons why similar marketplaces such as Silk Road have not emerged for CAMs can be put forward. Undoubtedly the most infamous of its kind, Silk Road operated as a Tor network hidden service and became a hub for the commerce of illegal goods, drug paraphernalia in particular (Christin, 2013). Despite having shut down twice, the business model of Silk Road has persisted in Darknet and paved the way for several online illegal marketplaces (Lacson and Jones, 2016). To establish trust among its members, Silk Road used an escrow system very similar to the one adopted by legal e-commerce websites. Furthermore, Bitcoin provides transactions with anonymity and security. Despite several crackdowns and some fraudster administrators along the way, largely owing to the resilient design of Silk Road, Darknet marketplaces still survive as a lucrative, reliable and sustainable option for commercial trade of illegal goods. During the rise and fall of Silk Road, there were several non-commercial CAMs-centered hidden Tor websites to the extent that Tor Network is sometimes called as a safe haven for abusers (Greenberg, 2014). However, although subscription-based and pay-per-view business models of adult entertainment websites have been imitated before by abusers, Silk Road never inspired the commercial traders in such ways. Surely, aforementioned features of legal digital goods and the communal aspects of abusers would be still relevant and would hinder a profitable marketplace, but this remains an interesting point that needs to be emphasized.

4. NEW COMMERCIAL FORMS

Despite all mentioned obstacles for the commercial trade of CAMs, abusers still find new ways of making money. Since it is impractical to impose IPR law and DRM on them, these new methods mainly aim to decrease the excludability and rivalry and increase the transparency of CAMs. Consequently, in these new commercial forms, potential buyers are unable to have an impact on the seller's profit by unauthorized uses like piracy. Therefore, the need to the external help of legal and technical measures becomes redundant as a direct result of the inherent features of such new online threats to children.

4.1 Webcam Child Prostitution

Webcam child prostitution (WCP), also known as live streaming of child abuse and webcam child sex tourism, is an emerging form of online child sexual abuse which the victim basically sells his/her live sexual images through Voice-over-IP (VoIP) applications. Although Europol proclaims WCP is an established reality (Europol, 2015: 29) and has connections with child sex tourism (Europol, 2016: 26), publicly known cases tell a different story. During Operation Endeavour, the only and a highly publicized example, 29 international arrests were made and 15 Filipino children were rescued (Cohen-Almagor, 2015: 299). However, this is not even the tip of the iceberg according to the Terre des Hommes (TDH) Netherlands. To demonstrate a glimpse of the issue's true scale, TDH Netherlands created a 3D model of a 10 years old Filipino girl and named her "Sweetie". In a sting operation orchestrated by TDH Netherlands, 1000 potential abusers offered Sweetie money for sexual acts in 10 weeks (Crawford, 2013; Lemz, 2014). According to TDH Netherlands, while the family-run individualistic schemes consist of the majority, "dens" disguised as legal enterprises are also involved in this criminal activity (Terre des Hommes Netherlands, 2013b: 25-28).

In WCP, the parties meet each other in various online environments such as social networking sites, public chat rooms and online dating sites. After the initial contact, conversation resumes as video chat. It is observed that the visual session of relationship is shaped by the sexual requests of abusers. Thus, severity and price of the live sexual abuse might increase throughout the session. In addition to horrific psychological consequences for the child, this heinous act also presents an effective, profitable and flexible business model, particularly compared to the commercial trade of CAMs. However, anecdotal evidences paint a slightly different picture. While undressing and masturbating are common, sexually extreme demands make up the minority on video chats (Terre des Hommes Netherlands, 2013b: 55). Furthermore, the total price of each session ranges from 11.50 to 46 US dollars (Terre des Hommes Netherlands, 2013a: 25). However, theoretically, WCP has more potential danger than those achieved by real life incidents so far.

In WCP, child abuse images are produced instantly during video communication as a result of live interaction between the abuser and the child. And this “on live” aspect alone makes WCP a lot more different from its previous equivalents. When an abuser contacts the same child and demands the same sexual content multiple times, every encounter creates relatively more dynamic and definitely unique experience than viewing still CAMs. Thus, this experience which remains fresh and arousable even at successive consumptions makes it worth to pay. For the abuser, with the help of third party applications, it is possible to record the video chats to use them later for sexual satisfaction. However, instead of relying on such still CAMs of past communications, abusers seem to look for the live experience again. And this thrill-seeking attitude of abusers keeps the demand stronger and persistent. Since there are not enough subjects to test these reasonable assumptions at the moment, exact psychological motives driving the demand of WCP will probably remain at dark for a long time. Alternatively, scarcity also might be involved in the consumer behaviour of abusers. Since only a few people can access the video chat at any given moment, such technological restriction on interaction can make the good scarce enough to have a higher price than still CAMs.

As mentioned before, digital goods are non-excludable, non-rival and not transparent and these features make their markets more vulnerable to fail. Unfortunately, WCP not only challenges all core aspects of digital goods but also have additional strengths that producers of its legal equivalents would not dream of. In addition to the inherent “on live” aspect which makes every individual interaction unique almost automatically, the abuser has absolute control over who can access video chat session. Just by a simple click, a potential buyer can be excluded immediately. Furthermore, the first minutes of every chat fulfill the transparency condition by which the parties can see each other and discuss the particular aspects of trade such as sexual demands and amount of money. On top of these, WCP also inherently allows the implementation of price and product discrimination by the help of some basic features of VoIP technologies. Teleconferencing, an essential feature of almost every VoIP product at the moment, enables the simultaneous communication of several people. In WCP, it is possible to use teleconferencing to turn video chat into a bidding process. Thus, an abuser can effectively create price discrimination by eliminating potential buyers who are willing to pay less money. The same bidding process also can be applied for product discrimination. This time, the abuser can form a scenario-based session in which sexual demands of potential buyers are met. For instance, in a chat session where a child undresses and then masturbates, the abuser can disconnect from the session those who do not pay for the masturbation part. Luckily, as much as the anecdotal evidence discovers, abusers haven’t tried to exploit the teleconferencing feature in this way.

4.2 Crowdfunding the Abuse

Crowdfunding is a recently popular way of gathering money for the vast motives which varies greatly from financing new musicians to supporting innovative products of start-up companies (Moritz and Block, 2016). In order for the crowd to find, examine and fund the projects, several websites have been founded such as Kickstarter, Indiegogo and GoFundMe. Fundamentally, capital seekers promise to give something in exchange of the money provided by the crowd. The liability of capital seeker pertains to the project and differs with the amount of individual funds. Therefore, producer credit in a music album, visit to a film set, dividend on a start-up company and many more other options can be set as liabilities of capital seekers before the crowdfunding process begins. There are two common models of crowdfunding at the moment: Keep-It-All and All-Or-Nothing (Cumming et al., 2014). In Keep-It-All scheme, capital seekers obtain all the raised money, regardless of whether they meet their goal. Conversely, capital seekers get nothing if they don't meet their goal in All-Or-Nothing model. For these reasons, the flexibility, simplicity and speed of crowdfunding makes it an essential method of funding for venture companies, individuals and non-profit organizations, particularly compared to more formal ways of the financial institutions.

Like sexual extortion transformed from a type of workplace harassment into an emerging online threat to children (Açar, 2016), crowdfunding took a twisted form of its legal equivalent as an act of online child sexual abuse. Possibly in 2014, a Tor Network hidden website named PedoFunding was founded (DeepDotWeb, 2014). During its very short live, this website released the snippets of child abuse videos to provide transparency. Unlike legal crowdfunding projects, money is raised for CAMs which already have produced in PedoFunding, not for the materials to be actualized in the future. For those who paid the pre-defined minimum level of Bitcoins, on the condition of reaching or exceeding the total fundraising target after one month, the full video was sent to funders and administrator took 22% commission of the total amount. In line with the All-Or-Nothing model, money is returned to funders in case the fundraising target is not reached. In that way, abuser guarantees his profit as soon as the target is reached. Child abuse videos still had all the vulnerabilities that the legal digital goods have, however, unauthorized use of such materials became a trivial matter for the abuser. The dependence on IPR law and DRM becomes completely unnecessary for the abuser in such a marketing strategy. Surprisingly and eerily, remarks of abuser exhibited a fine understanding of digital goods and online child abusers so clear that it summarizes the main points of this paper:

“... Before, it was almost impossible to make commercial grade child porn, since as soon as they sell it to one person, that video is all over TOR for free. This site aims to solve that problem...”

Luckily, mostly due to trust issues which cryptomarkets have already suffered a lot (Tzanetakis et al., 2015), PedoFunding couldn't survive. The administrator demonstrated his fury against fellow abusers:

“... You accused me of being a cop, you accused me of being a scammer. You made up fake rumors about bitcoins being unsafe to scare people away from my site. All because you are self-entitled brats who wanted your CP for free instead of having to pay producers a fair price...”

Later, it is revealed that PedoFunding is a one-man operation of Richard Huckle who is considered the Britain's worst paedophile by some (Culbertson, 2016)

5. IMPLICATIONS FOR RESEARCH AND PRACTICE

Abusers, potential victims and the online environments where they can meet each other have multiplied and diversified in recent years. Unfortunately and understandably, human, time and money resources of LEAs have not been able to keep up with this unprecedented pace. Additionally, in most countries, legal background does not provide enough support to LEAs in terms of applying unorthodox legal measures such as takeover of hidden websites (Cox, 2016) and using actual CAMs in undercover operations (Vendius, 2015). Therefore, reasonably, LEAs prioritize the cases which might lead to the identification of abuser(s) and victim(s). This unfortunate but inevitable prioritization of current online threats to children should also be done with a focus on the economics aspect.

LEAs have long been aware of that commercial online child sexual abuse might have close ties with child trafficking and child sex tourism. However, this seemingly knowledgeable approach originates from traditional assumptions on criminal behaviour, not the specific economic features of CAMs and distinct behaviours of online abusers. To more accurately assess an emerging threat, LEAs should have a more in-depth understanding of the economic aspect of such offences. It would definitely help identify the true scale and danger of WCP, Crowdfunding and similar types of future offences. Thus, it may hopefully allow a more effective allocation of already scarce resources. To illustrate how such prioritization is crucial, let's assume a hypothetical situation which involves several big non-commercial hidden websites and a few commercial hidden websites. As clearly exemplified in the context of crowdfunding, the customer base itself becomes the biggest threat to an “entrepreneur”. Therefore, LEAs should exploit this weakness of the market to the greatest extent possible. Even if it requires more intensive effort than non-commercial hidden websites, commercial hidden websites should be targeted first. Undoubtedly, every type of illicit online activity should be concern of LEAs regardless of its economic aspect. However, without eliminating the commercial sources, shutting down non-commercial ones might have undesirable consequences. Since the demand for CAMs generally remains intact after such shut-downs,

willingness to pay for CAMs might increase as an indirect result of LEAs' response. For this reason, as long as commercial sources are around, LEAs should eradicate them first, and then proceed to non-commercial ones.

For WCP in particular, psychological motivations of potential buyers should be revealed to profile possible offenders and assess the predisposition of ordinary people to some extent. Unfortunately, only 29 abusers were arrested in one case for WCP and not even a buyer for crowdfunding. Therefore, it is not reasonable to wait for scientifically measurable and comparable sample sizes. However, there are more viable ways to shed a light on the psychological motives of potential buyers. For instance, the demand for live/webcam-orientated adult entertainment might provide clues on the customer base of WCP since there are strong parallels between them. The answers to "Why are some people willing to pay for live online sexual interaction, while free adult content is abundant on the Internet more than ever?" would obviously yield more contribution than idly waiting. It is also another dark area in the literature, yet gathering volunteers for such research is less challenging. Conversely, for crowdfunding, its legal equivalent does not provide sufficient insight. Concept of legal sources is primarily about supporting an idea financially and getting credit for this contribution in case the project comes to life. However, in its dark and twisted sister, buyers pay for an already finished product. Therefore, psychological motives that drive the consumer behaviour might be different from those of its legal counterpart. It is a widely-accepted assumption that online child sexual abusers give a special value to new or rare materials (Quayle and Taylor, 2003; Virtual Global Taskforce, 2015: 19). Likely, the same attraction also drives the demand for crowdfunding.

6. CONCLUSIONS

As a heinous type of digital goods, online child abuse materials share attributes of its legal equivalents extensively yet do not take advantage of legal and technical shields of the latter. CAMs are also not excludable, not rivalrous and not transparent. And, the producers of CAMs cannot enforce IPR law or implement DRM technologies to minimize the loss of unauthorized uses like online piracy. Furthermore, DNS-based websites and centralized payment methods are easier to track. For those reasons, at the moment, online commercial sexual exploitation is not an urgent threat as it was before. However, abusers find new ways to increase the profitability of their malicious deeds.

Webcam Child Prostitution and Crowdfunding the Abuse are two recent examples of how abusers make CAMs excludable, rivalrous and more transparent. Utilization of Bitcoin, VoIP and anonymization technologies in committing such offences makes detection, let alone identification, very challenging. However, appropriate law enforcement responses to such emerging threats are the subject of another research. Nonetheless, at least, law enforcement agencies should rapidly

identify the economic aspects and correctly assess the dangers of such new malicious activities timely. In this respect, law enforcement agencies should also prioritize such commercial threats, even if they are seemingly unimportant or they require more effort to take down. Otherwise, law enforcement responses targeting non-commercial sources inadvertently might increase the demand for commercial CAMs. Lastly, the further research should focus on similar legal activities so as to shed a light on these severely underreported offences. For WCP, examination of the demand for live/webcam-orientated adult entertainment might reveal the core aspects of psychological motives of potential buyers. On the other hand, for Crowdfunding, the demand for new or rare CAMs might be more relevant than the motivations of funders of legal crowdfunding projects.

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