



DARKNET DRUG MARKETS IN A SWEDISH CONTEXT

A DESCRIPTIVE ANALYSIS OF WALL STREET
MARKET AND FLUGSVAMP 3.0

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Drug use is a global pandemic with overdose-related deaths on the rise. Technological advances have made drug markets more commonly located online, indicating that Darknet markets will become the drug markets of the future. While Darknet markets have existed since the year 2010, research on the phenomena is scarce. The Wall Street Market (WSM) was established in 2016 and by 2017 it was the world's largest international cryptomarket. Flugsvamp 3.0 is the most current Swedish domestic drug market on Darknet. *Aim:* This study examined WSM and Flugsvamp 3.0, regarding available drug types, number of advertisements, prices and countries of origin on WSM. The study also compared prices on these cryptomarkets with the street prices of Stockholm. During the research process, WSM was shut down by law enforcement. Therefore, an additional day of data collecting on Flugsvamp 3.0 was conducted. *Method:* The study utilized a method of structured simple observation. A descriptive analysis, with uni- and bivariate analyses, was conducted. *Results:* The most common drug on both markets was Pharmaceuticals, or prescription drugs. The market with the lowest prices was WSM, while street prices in Stockholm were the lowest of all three marketplaces. Germany most commonly shipped drugs to Sweden, via transactions through WSM. After the closure of WSM both number of advertisements and prices increased on Flugsvamp 3.0, in general. *Conclusion:* There is a pressing need for further research on Darknet drug markets, as the efficiency of law enforcement efforts to combat drug use depends on it.

Keywords: darknet, descriptive analysis, drug markets, Flugsvamp 3.0, Wall Street Market.

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INTRODUCTION

Drug use is a global pandemic, with damaging consequences for individuals and societies. The United Nations Office on Drugs & Crime (UNODC) (2018a) estimated that 450,000 people around the globe died in relation to drug abuse in 2015. Over a third of these deaths were a direct result from overdoses (UNODC, 2018a). Society faces increasingly diverse and complex challenges in handling the continuously growing global drug market. The range of substances and combinations available to users has never been more diverse (UNODC, 2018a). In Europe, overdose related deaths reached a record-breaking number in 2015 with 8,441 deaths (UNODC, 2018b). Increases in deaths due to overdoses were reported in Sweden, among other countries (ibid).

One of the main complications is that large parts of the drug market has moved from the street into online forums such as social media sites and the Darknet (Bakken & Demant, 2019; Hayes, Cappa & Cardon, 2018). A recent study (Bakken & Demant, 2019) found that the use of social media for drug dealing was quite common in the Nordic countries. Darknet and Dark web are two equivalent terms. Despite common belief, the World Wide Web only accounts for a minor part of all Internet traffic (Hayes et al., 2018). Most of the traffic goes through the Deep Web, a part of the Internet which has a more limited accessibility (Hayes et al., 2018; Bayoumy, Meland & Sinder, 2018). Within the Deep Web lies Darknet, which is intentionally hidden and inaccessible through traditional web browser and search engines (Hayes et al., 2018; Pergolizzi Jr., LeQuang, Taylor & Raffa, 2017). The Darknet is an environment where many illegal and morally questionable activities take place (Pergolizzi Jr. et al., 2017). Further, Darknet users and their product's origin enjoy full anonymity (ibid).

A cryptomarket is, according to Martin (2014a), a website with an encryption offering anonymity to its users and facilitating the exchange of goods and services. These goods and services are not necessarily illegal, although most of them are (ibid). Such illegal goods and services could be credit card information, child pornography, illicit drugs or even contract killing (ibid). Cryptomarkets are often considered to decrease violence within the illicit drug industry (Martin, 2014a; Hoyles, 2016). However, they have great social implications as they increase access and offer drugs with stronger potency than those available on the streets (Hoyles, 2016; Bakken & Demant, 2019). These implications could increase the numbers of drug addicts as well as the frequency of petty crimes that are committed in order to finance the individuals' addiction (Hoyles, 2016).

The Global Drug Survey found that the proportion of individuals using the Internet to buy drugs via Darknet rose between the years 2014 and 2018, from around 5 to 9 percent (UNODC, 2018b). The growth of Darknet marketplaces has subsequently provided great opportunities for criminal organizations to sell their illegal products (Hayes et al., 2018). The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) and Europol found that over 60 percent of Darknet markets' listings included illicit drug sales (UNODC, 2018b). Globalization further enables drug producers' strategies to quickly and cost-effectively transport drugs from distant locations and deliver them using standard delivery services (Pergolizzi Jr. et al., 2017). While drug trafficking through Darknet only represents a fraction of all drug trafficking it is continuously

growing (UNODC, 2018a). This growth remains a persistent trend despite the successes of law enforcement in shutting down platforms on Darknet (ibid).

The darknet is likely to continue to expand as a marketplace for drug generating increasing challenges for authorities (Pergolizzi Jr. et al., 2017; UNODC, 2018b). However, authorities have gained some momentum combatting cryptomarkets and just recently shut down one of the larger markets on Darknet (The Guardian, 2019). Unfortunately, empirical research on the Darknet is limited, especially within social sciences (UNODC, 2018b; Gustafsson, 2016; Hoyles, 2016; Bakken & Demant, 2019). The research gap concerning Darknet markets is evident and the need for further research subsequently pressing. The opportunities for investigations within these markets are comprehensive, where the functionality of the markets or what is offered is not the only possible focal point. Examining the affects it has when one of the markets is shut down, on the remaining markets is an interesting topic that this study will try to touch upon. Research on Darknet is especially relevant for the field of criminology (Soska & Christin, 2015; Martin, 2014a). For criminologists to stay updated in their studying of crime, cybercrimes must be prioritized. All evidence points to cryptomarkets on Darknet becoming one of the primary platforms for future drug transactions. Therefore, it is imperative that these markets are studied.

Aim

The aim of the present study was threefold; (i) to demonstrate what drugs are available, and the commonality of them, on Darknet, (ii) to demonstrate the mean prices of drugs on Darknet and (iii) to demonstrate which countries ship drugs to Sweden through transactions on Darknet. The present study focused on the Swedish consumers on Darknet and collected data from *Flugsvamp 3.0* and *Wall (WSM) Street Market*. The research questions posed were:

In a Swedish context,

- i. What drugs are the most common, or popular, on WSM and Flugsvamp 3.0?
- ii. Is it more expensive to buy drugs through cryptomarkets on Darknet than on the streets?
- iii. Which countries are the most likely to ship drugs to Sweden, through transactions on WSM?

Furthermore, the *Wall Street Market* was shut down during the present study and therefore an additional day of examining *Flugsvamp 3.0*, after the closing of *WSM*, was conducted. That additional data collection included both prices and number of advertisements.

The purpose of the present study was primarily to shed light on the Darknet drug markets available for Swedish consumers. This research attempted to increase the existing knowledge available on the cryptomarkets; *Flugsvamp 3.0* and *Wall Street Market*. This investigation was sparked by a nearly non-existent academic literature regarding these two markets.

BACKGROUND

The Darknet

The Darknet is an underground online marketplace, only accessible through a specific software (Hayes, Jeandesboz, Ragazzi, Simon & Mitsilegas, 2015). Darknet is not commonly known among the public. Even so, instructions on how to access and use it are available on the conventional Internet (Hayes et al., 2018). Since the Darknet cannot be accessed through conventional internet browsers unconventional browsers are used (ibid). One of the most widely used browsers is The Onion Router (TOR) (Hayes et al., 2018; Pergolizzi Jr. et al., 2017). While TOR requires a specific software and encryption, it is easy to use (Pergolizzi Jr. et al., 2017). TOR was initially developed by the U.S. Navy in the purpose of introducing secure communications through the Internet (Hayes et al., 2018; Haraty & Zantout, 2014; Gingerich, 2014). The router was later released to the public, which opened a gateway for criminals (ibid). TOR provides anonymity that generates both positive- and negative consequences. The router protects journalists, freedom of speech and enables access to censored content (Yetter, 2015) but simplifies the misuse of anonymity for criminals (Pergolizzi et al., 2017).

Researches that have examined drug dealing on social media and Darknet (Van Hout & Bingham, 2013; 2014; Orsolini, Francesconi, Papanti, Giorgetti & Schifano, 2015; Van der Gouwe, Brunt, Van Laar & Van der Pol, 2017; Bakken & Demant, 2019) have identified multiple commonalities to as why individuals choose these platforms rather than buying drugs on the streets. The commonalities include; quality, predictability, reliability and safety (ibid). Online drug purchases are considered worth the extra money due to anonymity and convenience (Pergolizzi Jr. et al., 2017). Additionally, Darknet is not dependent upon supplier and customer having the same geographical location in order to conduct businesses (UNODC, 2018b).

In order to understand how cryptomarkets work, it is necessary to have a fundamental understanding of crypto-currencies and their function (Pergolizzi Jr. et al., 2017; Hoyles, 2016). Cryptocurrencies operate similarly to conventional currencies, with fluctuating value according to demand (Martin, 2014b). Cryptocurrencies are one form of digital money, which function without control of entities and are not protected by any regulations or laws (Pergolizzi Jr. et al., 2017; Escalante, 2018). This allows all transactions in cryptocurrencies to be anonymous and untraceable (Pergolizzi Jr. et al., 2017; Hoyles, 2016). There are dozens of types of cryptocurrencies on the market today. Bitcoin (BTC) has become one of the most widely recognized cryptocurrencies in the world (Escalante, 2018). Although the purchases of BTCs without any identification is quite simple (Christin, 2013) they aren't truly anonymous. Law enforcement can monitor those who buy and sell BTCs, but have a harder time seeing what the BTCs are being used for (Martin, 2014a). As BTC is used for legitimate purchases as well, criminal activities cannot be assumed due to trading in e-currency (ibid).

The Drug Issue

According to the World Drug Report, around 275 million individuals used drugs at minimum once a year, during 2016 (UNODC, 2018a). The most commonly abused drug, worldwide, is marijuana (UNODC, 2018b). The second most

commonly used drugs include amphetamine-derived stimulants, such as ecstasy and methamphetamine (ibid). One way to categorize illicit drugs is the following classification; Depressants, Stimulants, Hallucinogens and Anabolic Steroids (Balhara, 2019).

Depressants include drugs that act on the central nervous system (CNS) and create a calming effect by suppressing brain activity (ibid). Prescribed depressant drugs include benzodiazepines (benzos) (Folkhälsomyndigheten, 2018). Opioids are, however, the most commonly prescribed medicine, worldwide (Balhara, 2019). They operate through opioid receptors in the brain and act as depressants (ibid). Opioids account for 76 percent of deaths where drug use is the main cause (UNODC, 2018a). The opioid that causes the most concern in Europe is heroin (ibid). However, non-medical use of methadone, buprenorphine and fentanyl has been increasing (ibid).

Stimulants are drugs that accelerate the activity of the CNS and make an individual feel energetic, focused and alert (Balhara, 2019). Stimulants include drugs like amphetamine, ecstasy, MDMA and cocaine among others.

Hallucinogens, also known as psychedelics, affect the CNS and alter the perception of reality, time and space (Balhara, 2019). Hallucinogens include drugs such as mushrooms and LSD. Drug use and popularity of specific drugs can differ from country to country (UNODC, 2018a). For instance, club drugs, like ecstasy, methamphetamine, cocaine, ketamine, LSD and GHB, are more commonly used in high-income countries (ibid).

Cannabis is a plant-derived drug and can be categorized within hallucinogens or depressants, depending on the type of cannabis (Balhara, 2019). As mentioned before, cannabis is the most commonly used drug worldwide (UNODC, 2018a) and the same applies to Sweden (Hermansson, 2017).

Androgenic anabolic steroids (AAS) mimic the effects of testosterone and result in increased muscle growth and strength (Cordaro, Lombardo & Cosentino, 2011). AAS-induced adverse effects target several organs and tissues, including the cardiovascular system and even the CNS (ibid). AAS dependence is a growing public health problem (ibid).

New psychoactive substances (NPS), or designer drugs, refer to drugs specifically made to cheat existing drug laws (Balhara, 2019). Synthetic drugs are chemically produced drugs that haven't been classified as illegal (ibid). The drug producers modify the initial chemistry behind the product before legislation is implemented, creating a new version of the drug (Hermansson, 2017). These drugs can be extremely dangerous with increased toxicity (Personne, Pettersen & Westerbergh, 2014; Hermansson, 2017) that can cause serious harm, even fatalities (UNODC, 2018a).

Sweden has attempted to minimize drug abuse (UNODC, 2007). Sweden adopted the Narcotic Drugs Act in 1968 (Narkotikastrafflagen - SFS 1968:64), making transferring, manufacturing, acquisition and possession a punishable offense (UNODC, 2007; Folkhälsoinstitutet, 2013). The Comprehensive Strategy for Alcohol, Narcotics, Doping and Tobacco (ANDT) was adopted as the national drug strategy for Sweden in 2016 (EMCDDA, 2018). Its goal is to have society

free from narcotics and doping, reduce medical- and social harm from alcohol and reduce tobacco use (ibid). Despite the declination of drug use in Sweden through the years, drug-induced deaths rates among Swedish adults was 96.7 deaths per million in 2013 (EMCDDA, 2013). This number was almost three times the European average, at that time (ibid). Even though there was a decrease in drug-induced deaths in Sweden in 2016 (EMCDDA, 2018) they were still four times higher than the European average of drug induced deaths (ibid).

The Swedish drug market is mainly dominated by cannabis and amphetamines (EMCDDA, 2018; Hermansson, 2017). In 2016, most seizures of drugs concerned cannabis, followed by prescription drugs and amphetamines (EMCDDA, 2018). The most common types of prescription drugs include benzodiazepines, followed by opioids and central stimulants (Hermansson, 2017). Drug prices can be an indicator for the commonality, or popularity of certain drugs (Guttormsson & Zetterquist, 2018).

Data from Stockholm´s wastewater levels showed that levels of cocaine and MDMA, or ecstasy, were higher during weekends than on weekdays in 2016 (EMCDDA, 2018). Traces of methamphetamine were, however, found to be evenly distributed over the week in the wastewater (ibid). The abuse of methamphetamine remains very limited in Sweden (Hermansson, 2017). Cocaine is relatively unpopular in Sweden, compared to the rest of Europe (Folkhälsomyndigheten, 2018; Hermansson, 2017). The seizures of cocaine have, however, been on the rise since 2008 (ibid).

The heroin market is quite limited in Sweden, but methadone and buprenorphine have become increasingly popular (EMCDDA, 2018; Hermansson, 2017). This popularity has resulted in lower pricing of white heroin, in Stockholm (Hermansson, 2017).

Since the beginning of 2013, seizures of NPS have been increasing in Sweden (EMCDDA, 2018; Hermansson, 2017). This increase did not have a lasting effect, as seizures of NPS stabilized in 2015 (Hermansson, 2017). One of the main reasons for this stabilization was the increase in demand of a synthetic cannabinoid, called ´spice´, and the fact that NPS use was related to several drug-induced deaths in Sweden in 2016 (Folkhälsomyndigheten, 2018).

Seizures of doping drugs, like anabolic steroids, has increased in Sweden, after a relative stability over the years (Hermansson, 2017).

Most of the drugs being sold in Sweden are produced abroad and smuggled into the country, via the Øresund Bridge (Folkhälsomyndigheten, 2018; EMCDDA, 2018). Herbal cannabis is, however, commonly produced domestically (ibid). Amphetamine mainly originates from the Netherlands or Lithuania, but some small-scale production is conducted in Sweden (Folkhälsomyndigheten, 2018; EMCDDA, 2018). Cocaine originates mainly from South America and is smuggled through Europe (EMCDDA, 2018). Heroin typically originates from Afghanistan and is trafficked via the Balkan route into Sweden (ibid). MDMA and Ecstasy are commonly smuggled into Sweden from the Netherlands (EMCDDA, 2018; Hermansson, 2017). Ecstasy is more often sold via the internet rather on the streets of Sweden (Hermansson, 2017). The same applies to NPS, which usually originate from China (EMCDDA, 2018). Smuggling via postal

packages has increased through the years (Hermansson, 2017; EMCDDA, 2018). This increase is attributed to the rise in drug sales through the internet (ibid).

Since 2013, the Swedish police has identified around 300 Swedish Darknet sellers (Lindroth, 2017). There are hundreds of buyers and a handful of vendors that are currently active in these marketplaces (ibid). A study looking into the popularity of drugs on Darknet found that cannabis was the most popular drug for Swedish consumers (Gustafsson, 2016). Cocaine was not popular, despite being one of the most popular drugs worldwide (ibid). Synthetic cannabis did not seem to be popular, but psychedelics were however quite popular (ibid). Swedish Darknet users bought what they desired, no matter if the street dealers offered it or not (ibid). It is possible they felt safer buying the drugs online (ibid). Due to Sweden's drug policy and overall mentality concerning drug use, it is likely that drug users see Darknet as a safer place to purchase (Johansson and DuPont, 2016). Bakken & Demant (2019) found that the majority of drug dealing on social media, regarding the Nordic countries, involved cannabis, cocaine, MDMA and amphetamine. It also included prescription drugs, mushrooms and heroin (ibid). Bakken & Demant (2019) further found that Danish drug users purchased cannabis in Christiania, an open cannabis market in Copenhagen, but used social media to purchase other types of drugs.

The Central Association for Alcohol- and Drug Information (CAN), in Sweden, has found the prices of hashish, marijuana, amphetamine, cocaine and heroin to be lowering steadily over the years (Guttormsson & Zetterquist, 2018). For instance, one ball of heroin costed 120-150 SEK in Stockholm, 2018 (Karlsson, 2018). However, this price decrease is with one exception; cannabis prices have recovered and are currently sold somewhat higher than they were in the 2000s (Guttormsson & Zetterquist, 2018). It is important to note that Sweden's metropolitan areas tend to have lower prices than the rest of Sweden (ibid).

Darknet Markets

Darknet markets have been operating since 2010 (UNODC, 2018b). They first gained notoriety in 2011 with *Silk Road* (ibid). *Silk Road* was the first cryptomarket and functioned as an underground drug market (Demant, Munksgaard & Houborg, 2016; Hoyles, 2016; Pergolizzi Jr. et al., 2017). According to an analysis on Darknet cryptomarkets through the years of 2011 to 2017, these markets operated on average for eight months (UNODC, 2018b). This is one of the reasons why cryptomarkets take turns in being the main platform for illicit activities, from *Silk Road* in 2011-2013, to *Agora* in 2014, *AlphaBay* in 2017 to *Dream Market* in 2015-2016 (UNODC, 2018b). Since the dissolution of *AlphaBay* in 2017 the top platform has been *Dream Market*. However, markets including *Valhalla*, *Silk Road 3.1* and *Wall Street Market* have become contenders for the top place (ibid). *Valhalla* was shut down by Finnish authorities earlier this year (The Guardian, 2019).

The past dismantlement of major trading platforms has not shown any major impacts on drug trafficking through Darknet (UNODC, 2018b). The systems are resilient and new markets are quickly re-established (ibid). An analysis made by Europol, revealed that following a shutdown of major cryptomarkets on Darknet, there was an immediate decline in overall Darknet activities and an increase in prices on active markets (ibid). However, these price increases did not last long with vendors and customers migrating to other markets as well (ibid). In July

2017, police forces from all over the world joined forces in taking down the largest drug market on Darknet, *AlphaBay* (UNODC, 2018a). The authorities also successfully took down the trading platform *Hansa* (ibid). Most of the users and vendors weren't affected by these events (ibid).

Silk Road became infamous due to its enormous selection of drugs, which included new psychoactive substances, as well as the professionalism and safety offered by the marketplace (Hayes et al, 2018; Pergolizzi Jr. et al, 2017). *The Silk Road* typically had small quantities of drugs being sold and transferred through postal systems, so they wouldn't spark suspicion by the authorities (Martin, 2014a; Demant et al., 2016). *Silk Road* was shut down by the Federal Bureau of Investigations (FBI) and Homeland Security Investigations (HSI) in 2013 (Hayes et al., 2018; Goldstein, 2013; Greenberg, 2013). These actions were perceived as great achievements for law enforcement (ibid). However, the Darknet drug markets seemed unstoppable, with new markets being initiated with continued activity of vendors and customers (ibid). *Silk Road 2.0* was opened in 2013, under new leadership (Soska & Christin, 2015; Van Buskirk, Roxburgh, Farrell & Burns, 2014). Brian Farrell, the operator of *Silk Road 2.0*, was arrested in 2014 (Europol, 2014).

In 2017, *Silk Road 3.0*, was actively being used (Pergolizzi Jr et al., 2017). The growth of *Silk Road* is a clear sign that law enforcement is struggling with preventative measures against the drug market on darknet (Martin, 2014a). One of the main issues law enforcement face is detection, due to the users' encryption and anonymity (ibid). If the investigators aren't able to break the codes of the encryption there is no way of knowing who is buying, selling or where the illicit drugs are being sent (ibid).

The Wall Street Market (WSM) was established in 2016 and contained a variety of goods, from narcotics to malicious software (Bayoumy et al., 2018). WSM was one of the largest darknet markets after the 2017 shutdown of *AlphaBay* and *Hansa* (The Guardian, 2019). This cryptomarket had over 1 million customers, around 5,000 vendors and more than 60,000 advertisements (ibid). WSM operated just like any other e-commerce website but its sole existence was to traffic contraband (ibid). The market dealt in cryptocurrencies; Bitcoin and Monero (ibid). WSM was taken down by German law enforcement in May of 2019 (ibid). Three German men; Frost, Kalla and Lousee, were arrested alleged to be administrators of the site, with a fourth man arrested in Brazil alleged to have worked as an online mediator (ibid). The men were accused of providing a platform for sale of illicit drugs, counterfeit goods and malware to customers on WSM over a three-year time span (ibid). The police operation of taking down WSM started after Finnish authorities took down *Valhalla* (The Guardian, 2019). This shut down led to some traders moving to WSM (ibid). In April 2019, WSM administrators were alarmed at the sudden surge of customers and they enacted an exit-plan, or exit-scam, that involved freezing escrow accounts and customer wallets (ibid). That gave them the power to take out all virtual currency connected to the market at that time (ibid). This, in turn, enabled investigators to act (ibid).

Flugsvamp is the only domestic market in Sweden and has similarities to *Silk Road*. *Flugsvamp* was initiated in 2014 and has become the leading arena for the Swedish Darknet drug trade (Delin, 2015). *Flugsvamp* trades solely with drugs, unlike other markets on Darknet (Hern, 2014). The site was down for six months

but resurrected as *Flugsvamp 2.0* with new administrators (Möller, 2016). In November of 2014 ‘Operation Onymous’ took place, where the FBI and numerous European police institutions joined forces to take down marketplaces on the Darknet (Hern, 2014). *Silk Road 2.0* and *Flugsvamp* were two of those markets that were shut down (Hern, 2014; Eggert, 2018). Over the years, Swedish authorities have been dealing with several cases of drug dealing where Darknet, for instance *Evolution* and *Flugsvamp*, was used for distribution (Eggert, 2018; Nilsson, 2017). In 2016 they apprehended a vendor that made over 3,000 transactions of amphetamine, cannabis, heroin, cocaine as well as prescription drugs, over a two-year period (Eggert, 2018). That same year the Swedish Custom Administration discovered two men that used postal delivery from Germany to transport amphetamine into Sweden, as well as cannabis, prescription drugs, LSD, amphetamine, cocaine and steroids. One of these men had even initiated his own sales-site, called “Littlefinger” (Nilsson, 2017).

Flugsvamp 3.0 opened in December of 2018. The 22nd of December in 2018, there were 50 active vendors on *Flugsvamp 3.0*. On *Flugsvamp* it is stated in the ‘Information to sellers’ that it is a marketplace for illegal drugs and prescription drugs. However, it is completely prohibited to sell weapons, stolen goods or counterfeit products. Selling to minors is also prohibited, even though *Flugsvamp* has no control over this, they appeal to the seller's responsibility and conscience (Nilsson, 2017).

METHOD

The present study collected data from the cryptomarkets; *Wall Street Market* and *Flugsvamp 3.0*, in March of 2019. The study was conducted without any interaction with the individuals operating on those markets. The study utilized the method of a simple structured observation.

A structured observation is a method that observes behaviour of individuals, systematically, and allows an examination without any contact (Bryman, 2008, chapter 11). One type of structured observations is called simple observation, where the observer has no influence on the situation being observed (Bryman, 2008, chapter 11). Collecting data from cryptomarkets can in fact be conducted without any interaction with criminals (Christin, 2013; Soska & Christin, 2015). The researcher can be unbeknown to sellers, buyers and marketplace operators (ibid). Importantly, data collection should not pose any risk to marketplace operators, vendors or buyers, since it entails copying existing, publicly disclosed data (Martin & Christin, 2016).

Precautions before entering Darknet can be found in Appendix I.

Ethical considerations

Despite the purpose of the present study being purely a data collection, an ethical approval of Malmö University was sought. The ethics board deemed it unnecessary for this study to seek their approval. They concluded that no individual would be affected by the current study.

Data Collection

The present study was initiated by necessary precautions outlined in Appendix I. Next, field notes were obtained from virtual documents and online forums. The data collected originated from two cryptomarkets on Darknet offering illicit drugs for Swedish consumers. The first market to be entered was the international market *Wall Street Market* (WSM). Secondly, the domestic cryptomarket in Sweden, *Flugsvamp 3.0*, was entered. Accounts were created on both markets and data collection was conducted from 14.03 2019 to 31.03 2019. The data collection intended to seek information on; a) what drugs were available on the cryptomarket, b) how many advertisements there were for each subcategory of drug, c) how much the drugs cost, i.e. mean price, and d) where the drugs originated from, in the international market. The researcher gained additional information from the Stockholm police on the street prices in Stockholm, Sweden, in March 2019.

The WSM market was the primary focus, due to it being the larger market with increased accessibility for a researcher. A five-day gap occurred for data collection from WSM due to complications on the market's webpage following relocation of their server. The final data was collected the following ten days;

16.03 to 22.03 2019 and 29.03 to 31.03 2019

When accessing WSM, the researcher logged in utilizing a username and password. Subsequently, a choice of several categories was presented. The category 'Drugs' was chosen. Within the *Drug* category there were several sub-categories available, see table 1.

Table 1. The drug categories available on the WSM.

<i>Drug categories</i>		<i>Subcategories</i>				
Cannabis	Weed	Hashish	Edibles	Concentrates	Seeds	Synthetics
MDMA						
Benzos						
Ecstasy						
Opiates						
Steroids						
Stimulants	Cocaine	Meth	Speed	Other		
Pharmaceuticals						
Psychedelics	LSD	Mushrooms	Other	RC's	2C-X	
Utensils						
Dissociates	GBL	GHB	Ketamine	MXE	PCP	Other
Alcohol						
Harm						
Reduction						
Tobacco						

Most of the categories were examined, some more thoroughly than others. Categories excluded from further analysis were *Utensils*, *Alcohol*, *Harm Reduction* and *Tobacco*. These categories were excluded due to the study's focus on illicit drugs.

The researcher chose one category at a time and then had the option of applying a certain filter to that search, see table 2.

Table 2. The filter available for the WSM.

<i>Filter for Wall Street Market</i>			
Search			
Results per page	X		
Minimum rating			
Minimum vendor level			
Ships from			
Ships to	X		
Amount per order			
Max price/unit (Euros or USD)			
Vendor activity			
Method	Multisig	Escrow	First
Cryptocurrency	Bitcoin	Monero	

The categories marked with an "X" were the filters used throughout this analysis

The filters applied were as follows; the chosen number of advertisements were 90 for the beginning of the data collection. After two days of data collection the number of advertisements chosen were 60. Secondly, *ships to Sweden* was chosen as a filter.

The data collection on *Flugsvamp 3.0* were conducted for two weeks from 14.03 to 31.03. The final data utilized was collected the following ten days;

14.03 2019, 18.03 to 19.03 2019,
21.03 to 22.03 2019 and 26.03 to 30.03 2019

WSM was shut down in May of 2019, i.e. amid this study. Due to this, an additional day of data collecting was conducted on *Flugsvamp 3.0*, in order to investigate if there were any changes in numbers of advertisements or prices of drugs. The data collection occurred the 6th of May 2019.

When accessing *Flugsvamp 3.0* the researcher logged in with a username and a password. When entering the market there were several drug categories to choose from, see appendix II, table 1.

The data collection of *Flugsvamp 3.0* included; *Cannabis, Benzos, Disco-drugs, Central stimulants, Opiates, Psychedelics, Prescription drugs and Doping*. The categories marked *Other* were ignored, due to the diversity of drugs within those categories. An increased emphasis was on the following; *Hashish, Alprazolam, MDMA, Ketamine, Amphetamine, Cocaine, Buprenorphine, Mushrooms, LSD and Steroids*. These subcategories had the highest numbers of advertisements, which was interpreted as an indicator of popularity within the Swedish market. The data obtained from *The Stockholm Police* was in direct relation to the information gained from *Flugsvamp 3.0*. The information requested by the researcher was therefore limited to the most common subcategories of drugs on *Flugsvamp 3.0*. Those subcategories were; *Hashish, Alprazolam, Ecstasy, Methamphetamine, Buprenorphine and LSD*.

Data Analysis

Following the data collection, the data was imported into *Microsoft Excel* where a descriptive analysis was conducted. The descriptive analysis included a uni- and bivariate analysis.

Several changes were made to the original data collected. First, all subcategories labelled *Other* were excluded due to their disparate nature. Next, the issue of currency was addressed. On *WSM* the drug-categories were offered in prices of both Euros and Dollars. On *Flugsvamp 3.0* all prices were offered in Swedish Kroners (SEK), the same applied for street prices obtained from police. The *WSM* data was therefore converted from Dollars to Euros, through an online converter where one Dollar was equivalent to 0,887 Euros. Next, all the prices from *WSM* were converted into SEK, through an online converter, where one Euro was equivalent to 10,6 SEK. Within both cryptomarkets the drugs were offered in various quantities; on one hand in units of measurements, like grams, and on the other hand in pieces or tablets. In some cases, a singular drug type was even represented in both various units of measurements and in pieces or tablets. In those cases, the quantity in the majority of price examples was chosen as the quantity as reference. All other price examples would be discarded. For instance; if most of the prices were quantified in units of measurements and not pieces, then the ones quantified in pieces were discarded and vice versa. Some of the data included prices that were not possible to employ in data analysis, for instance 4'200 dollars per gram, these cases were also discarded. Several cases of peculiarly high prices were present, especially on *WSM*, that had to be excluded in order to not skew the results. These prices included 'MDMA' being sold for 289,600-386,000 SEK per gram. This was deemed to be exceptionally high priced 'MDMA', seeing that it goes for around 200 SEK on average. For 'MDMA', there were three cases of these peculiarly high prices. On average they were around one to three cases in other drug types. However, 'ecstasy' had around 10 instances of these prices, per day. Those instances 'ecstasy' was being sold for around 212 to 2,848 SEK per piece.

The data analysis included descriptive frequency of number of advertisements, per day, on both cryptomarkets separately as well as a combined, where the mean number of advertisements per day were reviewed. In order to combine the advertisements of both markets there was a need for change of the collected data. These changes can be seen in table 3.

Table 3. The combination of drug categories in order to combine the number of advertisements of both cryptomarkets.

<i>Wall street market</i>	<i>Flugsvamp 3.0</i>
Weed	Sativa, Indica
Edibles	Edibles
Concentrates	Concentrates
Hashish	Hashish
Synthetics	Hybrid
Benzos	Diazepam, Alprazolam, Clonazepam, Flunitrazepam, Lorazepam
MDMA	MDMA
Ecstasy	Ecstasy
Methamphetamine, Speed	Amphetamine
Cocaine	Cocaine
Opiates	Oxycontin, Tramadol, Buprenorphine, Morphine, Heroin
Ketamine	Ketamine
GHB+GBL	GHB
LSD	LSD
Mushrooms	Mushrooms
2C-X	2C-B
Pharmaceuticals	ADHD, Sleep, Pregabalin, Erection
Steroid	Steroid

The data analysis included a descriptive frequency of the mean prices per day, for both cryptomarkets as well as street prices for some subcategories of drugs. The prices were then compared, between *WSM* and *Flugsvamp 3.0* as well as between cryptomarkets and street value. In order to compare the prices between the cryptomarkets the categories had to be changed again where they would have the same types of quantity. These changes can be seen in table 4.

Table 4. The combination of categories in order to compare the prices between the two cryptomarkets.

<i>Wall Street Market</i>	<i>Flugsvamp 3.0</i>
Hashish	Hashish
Benzos	Diazepam, Alprazolam, Clonazepam, Flunitrazepam, Lorazepam
Opiates	Oxycontin, Tramadol, Buprenorphine, Morphine
MDMA	MDMA
Ecstasy	Ecstasy
Cocaine	Cocaine
Methamphetamine, Speed	Amphetamine
Pharmaceuticals	ADHD
Mushrooms	Mushrooms
LSD	LSD
Steroids	Steroids
Ketamine	Ketamine

Heroin was excluded from the *Opiates* category, due to it being the only subcategory represented in grams and not pieces, or tablets.

The data analysis included a descriptive frequency of the advertisements originating from diverse countries, collected on *WSM*. The countries who had more than 10 advertisements for drugs that could be shipped to Sweden were

included. The rest were discarded. First, the researcher divided the countries into their representative continents; Europe, America and Asia. Secondly, an increased focus was put on the three countries that had the highest number of advertisements in order to answer the research questions previously presented in this study.

Issues of Validity and Reliability

There are several issues of reliability and validity that researchers face when utilizing the method of a structured simple observation. Structured observations are particularly vulnerable to a lower level of inter-observer consistency (Bryman, 2008, chapter 11). Another issue is the intra-observer consistency, or the degree of consistency of the application of the observation schedule over time (ibid). It is not an easy task to achieve reliability in a structured observation (ibid). This is obviously an issue because the validity of a study relies upon reliability (ibid). Due to the novelty of cryptomarkets there is limited institutional expertise present to assist scholars with the various methodological and ethical complexities that follow these types of studies (Martin and Christin, 2016).

RESULTS

This section will show the results found from the data collection on the following drug markets; *Flugsvamp 3.0*, *WSM* and the streets of Stockholm.

It is important to note that *WSM* is an international cryptomarket that carries out businesses all over the world. For the researcher to uphold focus on the Swedish market, a filter was chosen that represented drugs being shipped Sweden. However, this filter represents countries including Sweden, and not independently. Sweden was one of the possible countries for those drugs to be shipped to. The results from *WSM* should therefore be considered as assumptions regarding the Swedish consumers.

The number of drug advertisements

The most common drugs on *Flugsvamp 3.0* were 'hashish', 'LSD' and 'amphetamine'. 'Hashish' had the highest number of advertisements, with 470 advertisements total over 10-days. When examining patterns regarding the number of advertisements and time of the week the results showed the following: The number of advertisements were lower on a Monday and Thursday, while they were higher over the week. Further, examining specific 'party drugs', including 'ecstasy', 'MDMA', 'amphetamine', 'cocaine' and 'LSD' showed that the number of advertisements were the fewest on a Saturday for both 'MDMA' and 'amphetamine'. The number of advertisements for 'cocaine' and 'LSD' were however lowest on a Thursday and highest on a Saturday. (Appendix III, table 2).

The most common drugs on *WSM* were 'pharmaceuticals', 'opiates' and 'weed'. 'Pharmaceuticals' had the highest number of advertisements, with 7,865 advertisements total over 10 days. When examining patterns of distribution of number of advertisements over the weekdays, there was no pattern found on *WSM*. The numbers of advertisements were both the highest and lowest on a Saturday and Sunday. Further, the results showed that 'MDMA', 'cocaine', 'methamphetamine' and 'speed' all had the highest number of advertisements on

a Saturday and the lowest number of advertisements was distributed over other weekdays. (Appendix III, table 3).

The most commonly advertised illicit drug was ‘pharmaceuticals’, with 399 advertisements on average per day. The runner-up was ‘opiates’, with 373 advertisements on average per day and the third was ‘weed’ with 356 advertisements on average per day. ‘Steroids’ came close to being in third place with ‘weed’, at 350 advertisements on average per day. This relative popularity showed that ‘pharmaceuticals’ accounted for 15% of all the advertisements, on both cryptomarkets. ‘Opiates’ represented 14% of all the advertisements and both ‘weed’ and ‘steroids’ represented 13% of all the advertisements. The relative popularity of the drug categories, for both cryptomarkets combined, can be seen in figure 1. (Appendix III, table 4).

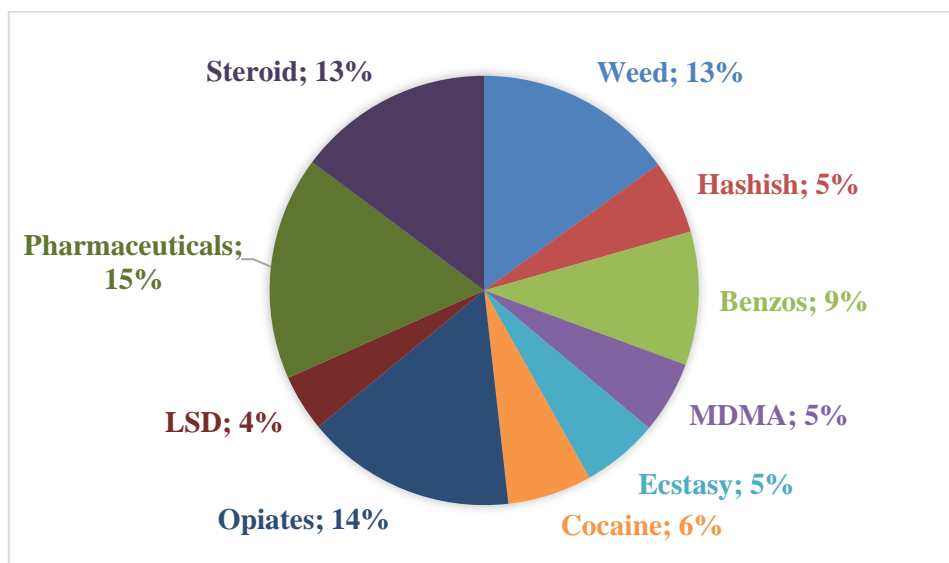


Figure 1. The percentage of advertisements of specific drug types, on both cryptomarkets combined.

Comparison of drug prices

The mean prices for drugs on *Flugsvamp 3.0* over a six-day period of data collection showed that ‘cannabis concentrates’ were the most expensive drug available on that market. ‘Cannabis concentrates’ were sold for around 1,390 SEK per piece on average on *Flugsvamp 3.0*. ‘Cocaine’ was the second most expensive drug on *Flugsvamp 3.0* being sold for 926 SEK per gram on average. ‘Ketamine’ was sold for 891 SEK per gram on average. The cheapest drug sold on *Flugsvamp 3.0*, over the period of the data collection, was ‘Diazepam’. ‘Diazepam’ was sold for 15 SEK per piece on average per day. ‘Alprazolam’ and ‘Clonazepam’ followed by being the top three cheapest drugs on *Flugsvamp 3.0*. To summarize the ‘Benzodiazepines’ were the cheapest types of drugs on *Flugsvamp 3.0* over this six-day period of data collection. When examining the prices over the weekdays the results showed that the prices were lower on a Wednesday and higher on a Monday. Regarding the ‘party drugs’, ‘MDMA’ and ‘ecstasy’ had higher prices on a Wednesday, Thursday, Friday and Saturday than on a Monday or Tuesday. For ‘amphetamine’ the opposite was true, were the highest price was on a Monday and lower prices later in the week. ‘Cocaine’ was most expensive on a Wednesday but the cheapest on Thursday, Friday and Saturday (Appendix IV, table 5).

The mean prices for drugs on *WSM* over a 10-day period of data collection showed that ‘Cocaine’ was the most expensive drug available on that market. ‘Cocaine’ was sold for 591 SEK per gram on average per day. ‘Steroids’ was the second most expensive drug on *WSM* being sold for 566 SEK per gram on average per day. ‘Methamphetamine’ was sold for 542 SEK per gram on average per day, making it the third most expensive drug available on *WSM*. The cheapest drug sold on *WSM* over the period of data collection was ‘Speed’. ‘Speed’ was sold for 40 SEK per piece on average per day. When examining the prices over weekdays the results showed that prices were higher on a Saturday and Sunday and lower on a Friday. The ‘party drugs’, ‘MDMA’ and ‘methamphetamine’ were the cheapest on a Sunday while they were the most expensive on Saturdays. ‘Ecstasy’ and ‘Cocaine’ were the cheapest on a Friday and the most expensive on a Saturday. (Appendix IV, table 6).

Information from the police in Stockholm, Sweden, showed that street prices for drugs in March 2019 were the highest for ‘LSD’ out of the categories requested from the researcher. ‘LSD’ was sold for 200 SEK per piece on average per day, on the streets of Stockholm. ‘Amphetamine’, ‘ecstasy’ and ‘buprenorphine’ followed, was sold for 135 SEK per piece on average per day, on the streets of Stockholm. The cheapest drug, out of the categories requested, was ‘alprazolam’ which was sold for 10 SEK per piece on average per day on the streets.

In the comparison of the two cryptomarkets, some of the drug categories were unusable. Due to a difference in categories between the markets, the category ‘Pharmaceuticals’ was not compared, seeing that only prices for ‘ADHD’ had been collected from *Flugsvamp 3.0*. In six out of eleven cases, *WSM* had lower prices than *Flugsvamp 3.0*. It can therefore be stated that it is cheaper to buy drugs on *WSM* rather than *Flugsvamp 3.0* even though it is not a substantial difference. The biggest difference in prices between *WSM* and *Flugsvamp 3.0* was regarding ‘Ketamine’ (Appendix IV, table 7).

In the comparison between the two cryptomarkets with street prices, only a handful of types of drugs were applicable. It also had to be considered that *WSM* only offered ‘benzos’ and ‘opiates’, and not the subcategories such as ‘alprazolam’ and ‘buprenorphine’. For those two categories of drugs there was solely a comparison between prices on *Flugsvamp 3.0* and street prices. The comparison showed no real consistency between the cryptomarkets and the street, as can be seen in table 5. ‘Hashish’ had a similar price on *WSM* and the street. The same applied to ‘LSD’, where prices were similar on *WSM* and the street. The drug ‘alprazolam’ had similar price on the street and on *Flugsvamp 3.0*. The same applied to ‘ecstasy’ and ‘amphetamine’.

Table 5. Comparison of mean prices in SEK between cryptomarkets and the street.

Drug types	Marketplaces		
	The street	Flugsvamp 3.0	WSM
Hash ¹	65	96,2	78,9
Alprazolam ²	10	15,9	
Ecstasy ²	135	113,1	41,5
Amphetamine ¹	135	143,7	290,8
Buprenorphine ²	135	253,3	
LSD ²	200	115,3	254

¹per gram ²per piece

Countries of origin on WSM

Examining the countries of origin on WSM, i.e. the countries that ship to Sweden among other countries, quite the diversity was found. Drugs were mainly shipped from within Europe to Sweden. There is however a substantial amount originating from the United States. The countries with the highest number of advertisements for drugs which could be shipped to Sweden, were Germany, Great Britain and the United States. The distribution of the number of advertisements shipping from the top three countries can be seen in figure 2. (Appendix V, tables 8, 9 and 10).

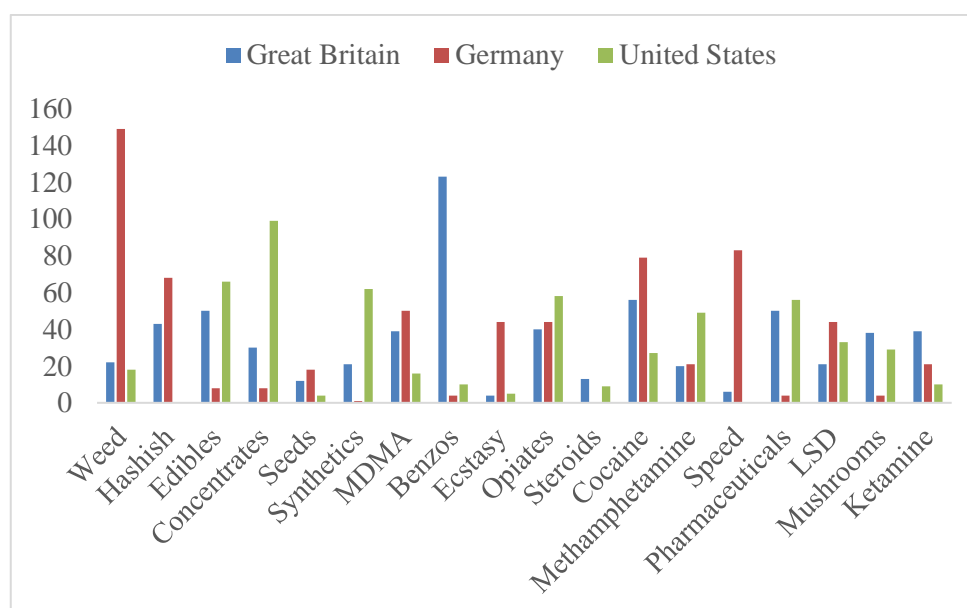


Figure 2. The number of advertisements for the top three countries of origin, on WSM.

Changes on Flugsvamp 3.0 following the shut-down of WSM

Due to the closure of WSM, Flugsvamp 3.0 was investigated by the researcher again for one additional day. The following results were found.

The changes of numbers of advertisements on Flugsvamp 3.0 can be seen in figure 3. Cannabis, both ‘sativa’ and ‘indica’, increased in numbers of advertisements as well as ‘hybrid’ Cannabis and ‘concentrates’. ‘Hashish’ decreased in numbers of advertisements while ‘edibles’ stayed the same. The number of advertisements in the subcategory of ‘benzos’ decreased for all drugs except for ‘flunitrazepam’, which increased. The number of advertisements of

‘ecstasy’ increased, while ‘MDMA’ decreased. The number of advertisements of ‘amphetamine’ and ‘cocaine’ increased. The subcategories of ‘opiates’ all decreased in numbers of advertisements, except for ‘oxycontin’ and ‘heroin’ which increased. ‘Mushrooms’ and ‘LSD’ both increased in numbers of advertisements. ‘Steroids’ increased significantly in numbers of advertisements and had the highest increase of all the subcategories on *Flugsvamp 3.0*. The highest decrease in numbers of advertisements was for ‘clonazepam’. (Appendix VI, table 11).

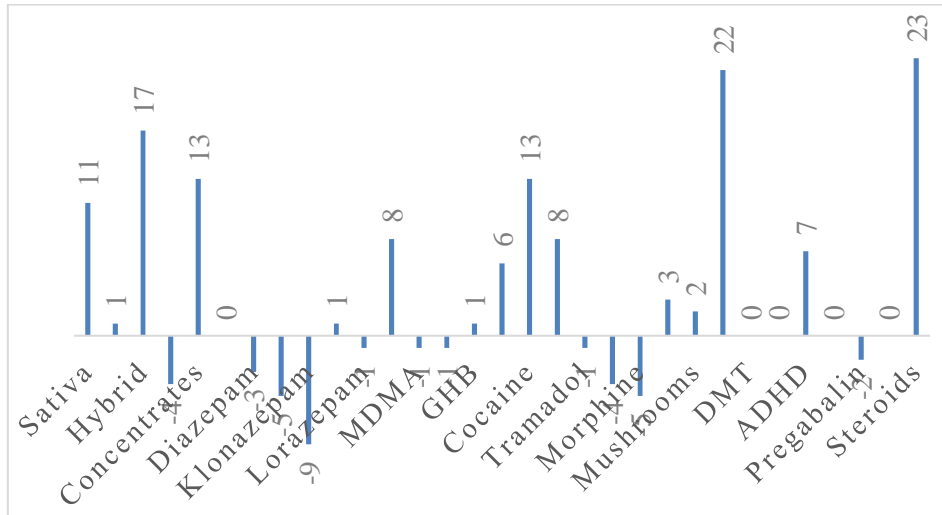


Figure 3. The changes in numbers of advertisements on *Flugsvamp 3.0*, after the closing of WSM.

The relative changes of prices on *Flugsvamp 3.0* after the closing of WSM can be seen in table 6. ‘Alprazolam’ had the highest increase after the closing of WSM, pricewise, with a 131% price increase. ‘Amphetamine’ had the highest price decrease, i.e. it was 12% cheaper on *Flugsvamp 3.0* after the closing of WSM. All the subcategories were more expensive after the closing of WSM, except for ‘amphetamine’ and ‘ecstasy’.

Table 6. The comparison of mean prices, in SEK, per day on *Flugsvamp 3.0* before the closing of WSM, with the mean prices, in SEK, on *Flugsvamp 3.0* after the closing of WSM.

Drug types	Mean price per day	06.05 2019
Hashish ¹	96	98
Alprazolam ²	16	37
Ecstasy ²	113	99
Amphetamine ¹	144	116
Oxycontin ²	199	223
Buprenorphine ²	253	264
LSD ²	115	124
Steroids ²	335	356

¹per gram ²per piece

DISCUSSION

Initially this study posed three research questions, with one additional question due to the shutdown of *WSM*. Main findings were that pharmaceuticals were the most common drugs on both cryptomarkets and that drug prices are lowest on the streets, followed by *WSM*, as *Flugsvamp 3.0* had the highest prices. Germany was the most common country of origin shipping drugs to Sweden via transactions on *WSM*. Additionally, results indicated that both advertisements and prices increased on *Flugsvamp 3.0*, after the shutdown of *WSM*.

Since *WSM* was permanently shut down while research was ongoing, this research is, to the author's best knowledge, the only study that have examined that cryptomarket.

In the present study, the number of advertisements is considered an indicator of commonality and even popularity of drugs on cryptomarkets. The study investigated the number of advertisements on both markets separately as well as the relative commonality of the drugs, on both markets. When combining the advertisements from both markets the relative commonality of pharmaceuticals was the highest. These findings are in line with previous studies (Hermansson, 2017; UNODC, 2018).

The most common drug type on *WSM* was pharmaceuticals, which is in line with previous studies, although prescription drugs were the second most seized drug in Sweden, in 2016 (Hermansson, 2017). The most popular drug in Sweden in 2016 was cannabis (EMCDDA, 2018; Hermansson, 2017). The results from the present study may therefore indicate a recent change in drug habits. In similarity to Danish drug users, another possibility is that Swedish drug users prefer to buy cannabis from the streets (Bakken & Demant, 2019).

The results regarding the number of advertisements in relation to weekdays did not show a clear pattern for *WSM*. There were, however, more advertisements for the party drugs; MDMA, cocaine, methamphetamine and speed, on a Saturday compared to the rest of the week. This is line with previous findings (EMCDDA, 2018).

The most common drug on *Flugsvamp 3.0* was hashish, which is in line with the commonality of drugs in Sweden in 2016 (Hermansson, 2017; UNODC, 2018a). Weed was the third most common drug on *WSM*, which could indicate that some drug users would rather buy cannabis from Darknet than on the streets, contradicting results from previous studies (Bakken & Demant, 2019).

LSD was the second most common drug on *Flugsvamp 3.0*, which is in line with previous studies that have found party drugs to be popular in countries with high income such as Sweden (UNODC, 2018a). However, the researcher found very few discussions on LSD in previous studies of popular drugs in Sweden (ibid). These results were therefore somewhat of a surprise.

Amphetamine was the third most common drug on *Flugsvamp 3.0*, which supports previous findings that the Swedish market is dominated by amphetamine and cannabis (EMCDDA, 2018; Hermansson, 2017; Bakken & Demant, 2019).

Interestingly, steroids were the fourth most common drug concerning relative commonality of both markets. Previous research did not find similar results, but instead stated that anabolic steroid use was on the rise (Cordaro et al., 2011; Hermansson, 2017). This could quite possibly be an indicator of just that.

The number of advertisements showed no clear pattern of distribution over the week, *Flugsvamp 3.0*. The party drugs, MDMA and amphetamine, had the fewest advertisements on a Saturday while cocaine and LSD had the highest number on a Saturday. This could be symptomatic of MDMA and amphetamine being in high demand before the weekend.

The prices were lower on *Flugsvamp 3.0* on a Wednesday but higher on a Monday. The party drugs, MDMA and ecstasy, had higher prices from mid-week to the weekend than at the beginning of the week. This could be indicative of those drugs being in high demand before the weekend, in line with previous findings (EMCDDA, 2018).

The prices on *WSM* were higher on a Saturday and Sunday and lower on a Friday. Party drugs, like MDMA and methamphetamine, were the cheapest on a Sunday but most expensive on Saturdays. At the same time, ecstasy and cocaine were the cheapest on a Friday and the most expensive on a Saturday. These results could be indicative of the popularity of certain drugs. It must also be considered that cryptomarkets have products on sale, like any other market, the lower pricing could therefore be affected by that.

When comparing the cryptomarkets, *WSM* and *Flugsvamp 3.0*, *WSM* had lower prices in most cases. The drug with the highest price for both markets was cocaine, which is in line with previous findings (Guttormsson & Zetterquist, 2018). In comparison with street prices, the street prices were the lowest in most cases. These results indicate that it is cheapest to buy drugs on the streets in Sweden. The next best thing is to buy them on *WSM* for the lowest prices, while *Flugsvamp 3.0* is the most expensive out of the three markets. These results are in line with previous studies, that have found that drug users will buy more expensive drugs through Darknet, rather than on the street, due to their increase feeling of safety (Bakken & Demant, 2019; Van Hout & Bingham, 2013; 2014; Orsolini et al., 2015; Var der Gouwe et al., 2017). The researcher hypothesized that it would be cheaper to buy drugs through Sweden's domestic market, considering costs of transportation. This, however, was not the case with their domestic market being more expensive than the international one. The perceived risk of buying drugs through the domestic cryptomarket could be higher and therefore more expensive than on the international market (Bakken & Demant, 2019; Pergolizzi Jr. et al., 2017). It is worth mentioning that studies have shown that drug prices tend to be lower in metropolitan areas, such as Stockholm (Guttormsson & Zetterquist, 2018). These results do, therefore, not necessarily apply to other regions in Sweden.

The country that ships most of the drugs to Sweden, via transactions through *WSM*, is Germany. Although never explicitly mentioned in previous studies, it was mentioned that European countries often ship drugs to Sweden via the Øresund bridge and the Balkan route (Folkhälsomyndigheten, 2018; EMCDDA, 2018). Based on previous findings, one might have expected the Netherlands to be one of the top three countries to ship to Sweden (Folkhälsomyndigheten, 2018;

EMCDDA, 2018). However, it is quite possible that the category marked 'EU' as country of origin could include the Netherlands, as well as drugs being trafficked from the Netherlands and through Germany to Sweden.

When investigating *Flugsvamp 3.0* following the closure of *WSM* it was found that most of the drug advertisements had increased since the closure of *WSM*. These results could be an indicator of two possible explanations. First, that vendors decided to move from *WSM* to *Flugsvamp 3.0* or secondly, that there was an increase in demand following the closure of *WSM*. Interestingly, steroids had the highest increase of number of advertisements, overall.

Similarly, most of the drug types on *Flugsvamp 3.0* had increased in prices after the closure of *WSM*. Ecstasy was one of the drug types that decreased in pricing. This finding could be affected by the fact that the additional data was collected on a Monday and the sales of ecstasy tend to increase during the weekend (EMCDDA, 2018).

This increase in advertisements and prices of drugs is in line with previous findings (UNODC, 2018b). However, these increases are not expected to be long-lasting as previous fluctuations on Darknet markets have been shown (ibid).

Limitations

The type of method used in the present study has both low reliability and validity. An attempt to maintain some level of inter-observer consistency was made, by examining all categories available on the cryptomarkets. Likewise, an attempt was made to increase the intra-observer consistency by having an observation schedule. However, this schedule was disrupted when *WSM* was closed for several days while data collection was ongoing.

The collection of data from *Flugsvamp 3.0*, concerning drug prices was somewhat limited in this study. This was due to time restrictions. When collecting information about drug prices in that market, each and every advertisement had to be examined in order to attain adequate information. The researcher therefore made the choice to emphasise *WSM*.

The collection of data from *WSM* presented challenges, as information does not necessarily solely represent drug transactions to Sweden, but worldwide. The researcher chose a filter that included Sweden as a destination, but it could not exclude other countries. The results from *WSM* should therefore be regarded as assumptions concerning Swedish drug consumers.

Examining two cryptomarkets simultaneously presented a complexity issue. Complexities included differences in the categorisation of drug type, prices advertised in several currencies as well as differences in the extent of information available in each advertisement. Future studies would benefit from examining *Flugsvamp 3.0* more thoroughly and attain more detailed information from one market. Focusing on fewer subcategories might also prove to be beneficial.

Although the information received from the police of Stockholm was highly appreciated, it would have been beneficial to this study if additional information could have been obtained for additional comparisons.

When examining the countries of origin on *WSM*, the issue of EU being a subcategory made it impossible to know the exact origin of drugs.

CONCLUSIONS

This study aimed to examine two Darknet drug markets offering services to the Swedish consumer. Results showed that most of the advertisements involved pharmaceuticals, or prescription drugs. The prices were the lowest on the streets of Stockholm, which is in line with previous studies. The prices on *WSM* were lower than on *Flugsvamp 3.0*. This could possibly be connected to the perceived risk of purchasing through the only domestic market being considerably lower than purchasing drugs through an international market. In that case, drug consumers might be more likely to be willing to pay more for that sense of security. Finally, Germany was the country that shipped most drugs to Sweden, via transactions through *WSM*, which is quite possibly linked to the trafficking route through the Balkans and Denmark. The additional data collected from *Flugsvamp 3.0*, following the closure of *WSM*, showed an increase both in number of advertisements as well as the prices of drugs. This could be an indicator of increased traffic on *Flugsvamp 3.0* following the closure of the international market, which according to previous studies is not likely to be long-lasting. This study increased the information available on two cryptomarkets being used by Swedish consumers, among others. Importantly, it is possibly one of the last investigations of the Wall Street Market, which has dominated the Darknet platform for some years now. Future research would benefit from putting emphasis on one cryptomarket at a time and in a Swedish context, *Flugsvamp* would be a logical choice. Cryptomarkets on the darknet are in great need of further investigations.

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APPENDIX I

Precautions when accessing the Darknet

When entering the Darknet for research purposes, one must consider potential risks. Precautions made when conducting the present study were; the installation of a virus protection program on the computer being used, intended to protect the computer against possible hacking attempts and malware. Secondly, a VPN-account was installed, which made the tracing of the computer's IP number more difficult, hence protecting the geographical location of the computer. Thirdly, a TOR-browser was installed on the computer. Additionally, the researcher confided with a police officer and a cyber-specialist in order to be aware of all possible threats presented by accessing the Darknet.

APPENDIX II

The drug categories on Flugsvamp 3.0

Table 1. The drug categories available on Flugsvamp 3.

<i>Drug categories</i>	<i>Subcategories</i>
Cannabis	Sativa, Indica, Hybrid, Hashish, Concentrates, Edibles, Other
Benzos	Diazepam, Alprazolam, Clonazepam, Flunitrazepam, Lorazepam, Other
Disco	Ecstasy, MDMA, Ketamine, GHB, Other
Stimulants	Amphetamine, Cocaine, Other
Opiates	Oxycontin, Tramadol, Buprenorphine, Morphine, Heroin, Other
Psychedelics	Mushrooms, LSD, DMT, 2C-B, Other
Prescription drugs	ADHD, Sleep, Pregabalin, Erection, Other
Doping	Steroids, Other

APPENDIX III

The number of advertisements on the cryptomarkets

Table 2. The number of advertisements on Flugsvamp 3.0, over a 10-day period

<i>Drug types</i>	<i>14.03</i>	<i>18.03</i>	<i>19.03</i>	<i>21.03</i>	<i>22.03</i>	<i>26.03</i>	<i>27.03</i>	<i>28.03</i>	<i>29.03</i>	<i>30.03</i>	<i>Total</i>
Sativa	7	6	8	9	10	11	12	14	12	12	101
Indica	12	14	15	18	17	18	20	22	19	18	173
Hybrid	13	12	14	16	16	15	17	21	22	22	168
Hashish	40	46	48	49	45	49	48	53	46	46	470
Concentrates	7	8	8	9	9	9	10	8	8	8	84
Edibles	5	7	6	8	6	5	5	5	4	4	55
Diazepam	11	12	13	12	11	12	10	10	9	8	108
Alprazolam	24	23	23	21	20	23	22	21	18	17	212
Klonazepam	14	12	14	12	11	12	12	12	13	12	124
Flunitrazepam	0	0	0	1	1	2	2	2	1	1	10
Lorazepam	1	1	1	1	2	2	2	2	2	2	16
Ecstasy	26	28	29	28	30	31	30	30	30	28	290
MDMA	18	17	27	18	18	17	17	17	17	16	182
Ketamin	2	5	5	7	6	7	7	7	8	8	62
GHB	2	2	2	3	3	3	3	3	3	2	26
Amphetamine	34	35	34	37	34	31	26	26	25	23	305
Cocaine	14	16	18	15	16	16	15	17	17	19	163
Oxycontin	11	11	13	11	11	17	22	21	20	20	157
Tramadol	12	15	15	16	18	17	16	17	20	19	165
Buprenorphine	15	17	15	17	15	16	15	14	11	11	146
Morphine	0	0	0	8	8	5	7	7	7	7	49
Heroin	7	8	7	0	0	7	7	7	7	7	57
Mushrooms	2	2	2	2	2	1	1	2	2	1	17
LSD	14	29	29	30	30	31	34	34	43	43	317
DMT	3	3	3	4	4	4	6	6	6	6	45
2C-B	4	4	4	4	4	4	4	4	4	4	40
ADHD	7	6	5	5	6	14	15	14	12	12	96
Sleep	17	14	19	13	12	19	20	16	18	15	163
Pregabalin	2	19	1	18	18	2	3	18	7	16	104
Erection	16	2	12	3	3	18	18	4	16	8	100
Steroids	11	2	2	11	11	11	11	11	11	24	105

Table 3. The average number of advertisements on WSM over a 10-day period.

Drug Type	Dates										Total
	16.03	17.03	18.03	19.03	20.03	21.03	22.03	29.03	30.03	31.03	
Weed	601	652	660	660	671	669	673	765	789	845	6985
Hashish	188	204	202	203	209	210	212	233	240	255	2156
Edibles	30	37	37	37	39	40	40	51	51	54	416
Concentrates	183	222	224	224	234	238	240	261	264	279	2369
Seeds	39	43	43	43	43	43	43	43	43	44	427
Synthetics	38	42	42	42	45	45	45	47	47	47	440
MDMA	349	203	205	206	210	214	216	238	247	266	2354
Ecstasy	311	211	211	211	318	221	223	236	237	268	2447
Benzos	660	433	430	429	426	426	435	461	465	487	4652
Opiates	895	705	707	702	700	704	710	724	727	771	7345
Steroids	800	657	657	658	656	656	656	708	720	726	6894
Cocaine	420	257	257	256	257	256	256	277	285	314	2835
Methamphetamine	200	105	106	106	110	111	111	122	122	122	1215
Speed	206	155	157	157	159	161	162	160	161	182	1660
Pharmaceuticals	1089	727	732	737	728	728	733	752	800	839	7865
LSD	158	158	156	158	161	164	165	196	192	221	1729
Mushrooms	68	68	68	69	71	70	71	78	78	79	720
RC's	19	19	19	19	19	19	19	19	19	18	189
2C-X	31	31	31	31	31	31	30	33	33	33	315
GBL	14	7	7	7	7	7	7	9	6	9	80
GHB	24	12	12	12	13	12	12	12	12	16	137
Ketamine	104	67	67	68	70	72	74	83	85	97	787
MXE	9	7	7	7	7	7	7	8	8	8	75
PCP	0	0	0	0	0	0	0	1	7	7	15

Table 4. The average number of advertisements, per day, on both cryptomarkets.

Drug types	Number of advertisements per day
Weed	356
Edibles	24
Concentrates	123
Hashish	131
Synthetics	30
Benzos	237
MDMA	127
Ecstasy	137
Amphetamine	87
Cocaine	150
Opiates	373
Ketamine	43
GHB	7
LSD	102
Mushrooms	37
2C-X	18
Pharmaceuticals	399
Steroid	350

APPENDIX IV

Mean prices on the cryptomarkets

Table 5. The mean prices, in SEK, on Flugsvamp 3.0 over a six-day period.

<i>Drug types</i>	<i>Dates</i>						<i>Mean price per day</i>
	18.03	21.03	27.03	28.03	29.03	30.03	
Hashish ¹	97,6	97,6	94,1	99,4	94,1	94,1	96,2
Concentrates ²	1619		1206,1	1458,4	1206,1	1458,4	1389,6
Diazepam ²	12,9		17,05				15,0
Alprazolam ²	21,1	15,9	11,3	15,6	15,6	15,6	15,9
Klonazepam ²	23,6		15,97				19,8
Flunitrazepam ²			85				85,0
Lorazepam ²	25		18,5				21,8
Ecstasy ²	107,7	106,9	116	116	116	116	113,1
MDMA ¹	233,2		258,3	258,3	258,3	258,3	253,3
Ketamin ¹	916		882,6	886,2	886,2	886,2	891,4
Amphetamine ¹	162,1	153,8	129,5	129,5			143,7
Cocaine ¹	934,4		966,3	909,5	909,5	909,5	925,8
Oxycontin ²	170,1		202,6	207,8	207,8	207,8	199,2
Tramadol ²	22		26,8	21,38	21,38	21,38	22,6
Buprenorphine ²	324,8	304,8	218,98	223,7	223,7	223,7	253,3
Morphine ²			235,5				235,5
Mushrooms ¹	118		118	105	105	105	110,2
LSD ²	113,2	118,8	113,8				115,3
ADHD ²	68,5		68,8	74,7	74,7	74,7	72,3
Steroids ²	599,5	241,9	301	301	301	266,88	335,2

¹per gram ²per piece

Table 6. The mean prices on WSM over a 10-day period

Drug types	Dates of data collection										Mean price per day
	16.03	17.03	18.03	19.03	20.03	21.03	22.03	29.03	30.03.	31.03	
Weed ¹	108,1	98,6	76,3	79,5	79,6	79,8	74,6	89,5	90,7	85,6	86,2
Hashish ¹	97,0	121,2	81,0	70,3	71,3	71,3	71,3	70,1	70,1	64,9	78,9
Edibles ²	155,3	155,3	124,9	124,9	137,0	137,0	137,0	143,0	143,0	143,0	140,0
Concentrates ¹	331,4	292,3	182,9	169,4	331,4	287,5	287,5	949,5	949,5	101,5	388,3
Seeds ²	154,5	154,5	136,7	136,7	136,7	136,7	136,7	136,4	136,4	136,4	140,2
Synthetics ¹	67,8	68,2	90,5	90,5	94,0	94,0	94,0	83,1	83,1	146,3	91,2
MDMA ¹	70,0	69,1	128,7	116,5	113,8	124,0	124,0	131,0	815,1	71,8	176,4
Benzos ²	425,3	425,3	425,3	182,5	232,6	232,6	440,0	280,5	280,5	668,0	359,3
Ecstasy ²	122,1	122,1	22,9	22,9	22,4	24,0	24,0	17,5	17,5	19,1	41,5
Opiates ²	473,4	558,5	523,2	353,0	483,3	530,4	389,6	602,5	602,5	407,4	492,4
Steroids ²	527,4	525,3	578,2	578,2	578,1	578,1	578,1	581,7	568,9	568,9	566,3
Cocaine ¹	778,7	732,3	581,4	564,5	564,5	569,6	569,6	504,1	511,2	530,8	590,7
Methamphetamine ¹	578,6	385,4	551,7	551,7	560,6	560,8	560,8	555,2	555,2	555,2	541,5
Speed ¹	55,4	65,0	33,9	33,9	40,2	40,2	40,2	30,3	30,3	30,3	40,0
Pharmaceuticals ²	355,5	350,9	452,9	462,4	376,3	376,4	433,1	112,5	152,2	437,9	351,0
LSD ²	353,4	320,3	351,8	366,8	171,9	252,3	252,3	151,0	161,0	161,0	254,2
Mushrooms ¹	128,8	171,6	180,7	212,8	212,8	212,8	212,8	195,7	195,7	195,7	191,9
Ketamine ¹	180,7	224,9	203,9	192,6	190,3	190,3	190,3	196,3	196,3	188,8	195,4

¹per gram

²per piece

Table 7. Comparison of mean prices in SEK, per day, between the cryptomarkets.

Type of drug	Wall Street Market	Flugsvamp 3.0
Hashish ¹	78,9	96,2
Benzos ²	359,3	157,4
Opiates ²	530,3	710,6
MDMA ¹	176,4	253,3
Ecstasy ²	41,5	113,1
Cocaine ¹	590,7	925,8
Amphetamine ¹	290,8	143,7
Mushrooms ¹	191,9	110,2
LSD ²	254	115,3
Steroids ²	566,3	335,2
Ketamine ¹	195,4	891,4

¹per gram ²per piece

APPENDIX V

Countries of origin on WSM

Table 8. The number of advertisements on the Wall Street Market divided by countries of origin, within Europe, that distribute drugs to Sweden (among others).

Type of drug	Europe									
	EU	Austria	Belgium	France	Germany	Great Britain	Latvia	Slovakia	Spain	The Netherlands
Weed	16			19	149	22				
Hashish	3			44	68	43			12	10
Edibles	1				8	50			15	
Concentrates	6		5	3	8	30				1
Seeds	6			4	18	12			3	10
Synthetics	1				1	21			1	1
MDMA	43			7	50	39				63
Benzos	9	10		3	4	123				4
Ecstasy	11		16	11	44	4				85
Opiates	18		4	13	44	40				11
Steroids	8					13	107			55
Cocaine	4			17	79	56				37
Methamphetamine				5	21	20				6
Speed	9		6	4	83	6				33
Pharmaceuticals	19		9	82	4	50				4
LSD	24		2	6	44	21				6
Mushrooms	70				4	38			11	
Ketamine	17		6	5	21	39				26

Table 9. The countries of origin, within America and Asia, shipping to Sweden (among other countries) via transactions through WSM.

<i>Drug types</i>	<i>America</i>			<i>Asia</i>		
	Brazil	Canada	United States	China	Hong Kong	India
<i>Weed</i>		5	18			17
<i>Edibles</i>		5	66			
<i>Concentrates</i>		6	99			
<i>Seeds</i>			4	59	30	
<i>Synthetics</i>			62			
<i>MDMA</i>	1	2	16	4		
<i>Benzos</i>			10			
<i>Ecstasy</i>			5			
<i>Opiates</i>		5	58			
<i>Steroids</i>			9			
<i>Cocaine</i>	5		27		18	
<i>Methamphetamine</i>			49			
<i>Pharmaceuticals</i>			56			
<i>LSD</i>		23	33			
<i>Mushrooms</i>		11	29			
<i>Ketamine</i>			10			
<i>GHB</i>	4		4	4	8	
<i>MXE</i>				7		

Table 10. The top three countries of origin shipping to Sweden (among other countries) via transactions through WSM.

<i>Drug types</i>	<i>Countries of origin</i>		
	Great Britain	Germany	United States
<i>Weed</i>	22	149	18
<i>Hashish</i>	43	68	
<i>Edibles</i>	50	8	66
<i>Concentrates</i>	30	8	99
<i>Seeds</i>	12	18	4
<i>Synthetics</i>	21	1	62
<i>MDMA</i>	39	50	16
<i>Benzos</i>	123	4	10
<i>Ecstasy</i>	4	44	5
<i>Opiates</i>	40	44	58
<i>Steroids</i>	13		9
<i>Cocaine</i>	56	79	27
<i>Methamphetamine</i>	20	21	49
<i>Speed</i>	6	83	
<i>Pharmaceuticals</i>	50	4	56
<i>LSD</i>	21	44	33
<i>Mushrooms</i>	38	4	29
<i>Ketamine</i>	39	21	10
<i>GHB</i>			4
<i>Total number of advertisements</i>	627	650	555

APPENDIX VI

Additional data from Flugsvamp 3.0 following the shut-down of WSM

Table 11. The comparison of mean advertisements per day on Flugsvamp 3.0 before the closing of WSM, with the mean number of advertisements on Flugsvamp 3.0 after the closing of WSM.

<i>Drug types</i>	<i>Mean ads per day</i>	<i>06.05 2019</i>
Sativa	10	21
Indica	17	18
Hybrid	17	34
Hashish	47	43
Concentrates	8	21
Edibles	6	6
Diazepam	11	8
Alprazolam	21	16
Klonazepam	12	3
Flunitrazepam	1	2
Lorazepam	2	1
Ecstasy	29	37
MDMA	18	17
Ketamin	6	5
GHB	3	4
Amphetamine	31	37
Cocaine	16	29
Oxycontin	16	24
Tramadol	17	16
Buprenorphine	15	11
Morphine	6	1
Heroin	5	8
Mushrooms	2	4
LSD	32	54
DMT	5	5
2C-B	4	4
ADHD	10	17
Sleep	16	16
Pregabalin	10	8
Erection	10	10
Steroids	11	34