Dark Net Markets: White House Market Drug Trades

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Under the Supervision of

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An Honours Project submitted

In partial fulfillment

of the Degree requirements for the degree of

Bachelor of Arts - Criminal Justice (Honours)

Mount Royal University

Date Submitted

April 22, 2020

Abstract

Dark net markets (DNMs) are underground markets that ship goods and services globally. A main component of DNMs is the distribution of illegal drugs, these markets offer a wide range of drugs to users all over the world. Using data from the White House Market, a DNM site, this paper examines the price, amount, type, origin and destination countries of drug listings starting from January 6th to January 19th, 2020. It was found that there are restrictions on distribution based on the country of origin, with some countries having a higher rate of orders being shipped globally, potentially due to more lax standards in customs. DNMs appear to be a better alternative to conduct drug sale transactions than physical transactions as they add a substantial layer of protection from detection. This research also found that the drugs offered on DNMs are more pure, cheaper, and there is a significantly reduced chance of encountering physical violence.

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The Internet and Dark Web

There are three layers to the internet: the surface web, the deep web, and the dark web. The surface web is accessible through standard search engines such as Google or Bing. This section of the web only accounts for about 4% of the internet while the remaining 96% is in the deep web (Spalevic & Ilic, 2017, p. 75). The deep web is content that is not indexed by surface web search engines. Information such as medical records, company documents, and scientific reports are part of the deep web and often require passwords or identification to access. The dark web accounts for only a tiny fraction of a percent of the internet but is difficult to measure as sites tend to appear and disappear with little to no warning. Accessing the dark web requires specialized software such as The Onion Router (Tor) or invisible internet project (I2P).

Accessing the Dark Web

There are multiple ways of accessing the dark web, however, the most common is to use Tor (Unterfingher, 2019, para. 18). I2P is a newer way to access the dark web, I2P allows peer to peer routing to gain access to the dark web. I2P routes information between peers using one-way tunnels so anyone watching a user's traffic would only be able to capture the inbound or outbound traffic (I2P, 2019, para. 17). It is more difficult to access .onion sites than Tor and requires the user to have more technical knowledge to set up and use (I2P, 2019, para. 11).

The Internet Protocol (IP) is a set of numbers, and sometimes letters, given to each device connected to a network that identifies the device and location. This can be incriminating for the user of the device because internet service providers keep records of the sites users access and what addresses a user contacts (Spector, 2012, para. 1). Individual users sometimes do not want others access to their browsing history and being able to find which sites they visit. Others having access to this information is often deemed a violation of privacy, thus prompting some individual users to seek ways to protect their privacy.

One way for a user to retain their privacy is prevent internet service providers (ISP) from viewing the sites users' visit by using a virtual private network (VPN). Encryption requiring passwords will protect users' privacy from ISPs. Tor will encrypt a user's data when sending it through a relay network, making the information much more difficult to track (Nastula, 2018, p. 27). Tor has a relay network that was originally created to protect government communication but now anyone who downloads the program is able to improve their privacy and security on the internet (Nastula, 2018, p. 27-28). Relay networks have the source, the destination, and nodes in between. The source is the computer that is requesting information. Nodes are the devices between the source and the destination that encrypts traffic through, often volunteer computers or servers from Tor. VPNs often use servers in set locations while volunteer computers are personal computers that are capable of moving from place to place. The destination is the site the information request goes to.

Tor sends the request for information to the first node which sends it to a middle node for further protection. The middle node sends it to the exit node. The exit node

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asks the destination for information to send back to the user. This is so it appears that the exit node is making the information request. There are three volunteer computers between the user's device to the server. These three protect the user's IP address and information requests from the curious eyes of internet service providers or others (Nastula, 2018, p. 27). Three volunteer computers do not always protect the user's traffic between the Tor network and its destination. The exit node removes the encryption when the information passes by it, so it is possible to spy on the user's activity if they visit an unsecured HTTP site (Nastula, 2018, p. 27).

Many dark web users use a VPN to add an additional layer of security. VPN services generally have no desire to keep logs to protect their clients from police and become a more attractive option when compared to other VPN services (Taylor, 2020, para. 4). However, collecting some user data is necessary for subscriptions and warrants require companies to provide the requested information to law enforcement (para. 4).

The UKUSA agreement came into force in 1947 because of the Cold War and includes Canada, United States, New Zealand, Australia, and Great Britain (Rosen, 1993, para. 9). One programs under the UKUSA agreement is the Communications Security Establishment that is responsible for providing cryptographic material and documentation to appropriate governments and allowing the release of classified or controlled information to other entities (Rosen, 1993, para. 26-27). Information flows easily between countries of the UKUSA agreement, and these countries are more likely to collaborate with other countries they have agreements with. This does not guarantee

the countries will work together on the information, merely share the information with relevant parties as necessary.

The dark web is extremely difficult to police. The police require warrants to retrieve user information unless a service provider is offering that information. It would be inefficient for police to follow every string of nodes because of the time needed to obtain a warrant and the high chance it does not lead to a conviction or gain sufficient evidence. There is a chance that the node is taken down or leads to a dead end, meaning the time spent on the string of nodes was a wasteful use of resources.

Different Dark Net Markets

Dark Net Markets (DNMs) are markets that can be found on the dark web. They generally sell an assortment of items such as drugs, fraudulent identification, bank accounts, credit and debit cards with CVV, and bots and malware (White House Market, 2020). Markets differentiate from each other in membership, products and services, profit, fees, and security. However, their function is the same, connecting buyers and vendors for the trade of illegal goods and services (Bradley, 2019, p.1).

Many markets use 'referral membership' where someone already in the market must refer potential members to gain access. A referrer who allows a poorly behaved new member in may face a decrease in trust. A referrer also receives a small percentage of whatever the referee buys. Markets also require a fee from new vendors to start up, unless the vendor already has a reputable record on other sites to show they are not a risk. Some vendors will scam the buyers and make a bad name for the market, discouraging others from using the market.

The process of entering a DNM often follows in the same order. Captcha, PGP message, login with captcha, news and reminders, then accessing the site (Lane, Lacey, Stanton, Matthews, & Salmon, 2018, p. 282-283). Captcha is to check if it is a human or bot accessing the site. PGP is to verify user identity and strongly recommended on DNMs. There is often a second captcha on the login that must be completed for every attempt at logging in. News and reminders are not necessary or vital to sites, they simply keep users up to date.

Sites on the dark web are constantly under attack by law enforcement, organizations, and dark web users. Most DNMs have unique coding to support their infrastructure and once someone finds the code, that makes it much easier for others to attack the site and either steal from it or take it down. It is not strange for sites to turn off with little to no warning and never open again. Online wallets store money in the site itself, they cannot be accessed if the site is offline. This makes using DNMs with online wallets risky even if the administrator does their best to keep their market up and running because a hacker can take money from the online wallet if they take control of the market.

Silk road was one of the most popular DNMs on the dark web before it was shut down. Silk Road operators were making $90,000 a month in 2012 (Lavery, 2017, p. 2). Overall, DNMs can be very profitable for the administrators and operators. To keep their profits and clients, markets forbid outside contact information in listings or vendor profile pages. Outside contact information could lead users away from the market and lose the percentage of shares the market gets from each transaction. Failure to heed that rule may result in bans and vendor profiles being deleted. Also, most buyers will also

hesitate to buy from vendors without the safety net of a market and escrow which

protects their money from scams.

There is a rating system in markets to help vendors and buyers decide who they

can trust to buy from or sell to. Vendors with a low score will have less trust than those

with higher scores because the market works on reputation and recommendations (Van

Hout & Hearne, 2017, p. 107-108). Feedback, resolution of disputes, quick shipping,

and quality of products are fundamental to buyers in deciding who buyers would buy

from (p.108).

DNM users involved in drug transactions report less instances of threats to

personal safety, concerns of drug impurities, and law enforcement detection when

compared to other types of drug transactions such as street dealing (Bradley, 2019, p.

9). The experience of buying and selling is safer because there is a significantly

decreased opportunity for violence if there is no physical meeting (Ormsby, 2016, as

cited in Bradley, 2019, p. 8). However, there are more reports of losses resulting from

seizures of the market or financial losses related to volatile cryptocurrency on the dark

web (Barratt, Ferris & Winstock, 2016, p. 30).

Coercion is a risk to all DNM users, often including threats of destroying

someone's digital and offline life (Bancroft, 2020, p. 78). Vendors, and sometimes DNM

staff, have been known to send extortion letters to their buyers threatening to involve

law enforcement or spread false accusations unless money is paid (Darknetlive, 2020,

para. 1-4). Anyone going to law enforcement incriminates themselves, negating one

option available to others. Many experienced buyers will toss out the letter as the scam

it is (anyone going to law enforcement incriminates themselves) while newer buyers

panic.

The majority of DNM users show concern for anonymity and have a fear of being

the victim of a hacker, therefore, they tend to learn security mechanisms and have

technical knowledge around internet security (Hout & Bingham, 2013, p. 526-527).

Having knowledge about internet security allows users to better protect themselves by

using VPNs and setting up failsafes. One failsafe programmed into most VPNs is

shutting down all browsers if the VPN connection is disconnected so the user's location

is not revealed. Products offered on DNM are generally cheaper than on the streets,

even including the fee to the market itself and the shipping cost (p. 526). The difficulty in

acquiring cryptocurrency and setting up to access the DNM discourages many potential

users from using DNMs (p. 526-527).

Vendors

Vendors are dark web users who sell products and services on DNMs. Vendors

tend to have one category of product they specialize in, such as drugs, or someone

else's bank information. Within the drug category, many vendors advertise extensive

lists of drugs, showing knowledge and experience with a variety of drugs (Van Hout &

Hearne, 2017, p. 106). Vendors occasionally buy drugs that are not common in their

local physical area in bulk to resell for a profit (Van Hout & Bingham, 2014, p. 186).

Different types of drugs might be more difficult to acquire in some parts of the world

compared to others, and not everyone uses the dark web or has enough information on

DNMs to access them. Vendors set up within several weeks of interacting with other

members in forums to see if joining the market is an economical and smart decision

(Van Hout & Bingham, 2014, p. 186). Joining a site as a vendor is rarely a spontaneous

decision.

Vendors and buyers are rated by others on the DNM. Vendors like to sell to

buyers with high ratings and no previous conflicts with other vendors. Reputation is

extremely important to vendors. If there is doubt surrounding their reliability and product,

damage would be done to the trust between the vendor and buyer which would result in

a significant decrease in the number of buyers for that vendor (Van Hout & Hearne,

2017, p. 106). Many vendors have high ratings but comments from the same individual

over and over, with a small group of people making up their high rating. On a vendor's

profile, information on who rated the vendor and how highly they rated the vendor is

available.

New vendors will target buyers who are especially active with free samples and

discounts in order to have trusted buyers give them a high review (Bancroft, 2020, p.

113). It shows other buyers that even as a new vendor, they are trustworthy. This also

encourages buyers to review more often to increase their chances of being targeted for

free samples or discounts. It creates a positive feedback loop. Many buyers would still

hesitate to buy in bulk and will look to other buyers with high rates of review for

judgement (p. 114).

It is possible that vendors create multiple accounts on the same marketplace in

order to review themselves more positively. This will make vendors who review

themselves appear to be a more attractive option than other vendors. It does not make

the accounts that review them appear trustworthy, only inflate the number and rating of their vendor account on a superficial level. If buyers decide not to investigate the reviewers, they could have a untrustworthy vendor despite the high rating.

Buyers

Buyers have their own review ratings from vendors and how much they have bought so far on sites such as Silk Road 3.1 and the White House Market. DNMs have public listings that are available to everyone and stealth listings that are only accessible to repeat buyers the vendor trusts (Bradley, 2019, p. 5). Buyers are able to message vendors for custom listings and negotiate the price of products, although vendors do not have to accept any negotiations.

There is a dearth of information on users of DMNs. The demographic reported by Van Buskirk et al., (2016) is that recent buyers tend to be males under the age of 25, with 42% of them having completed courses after secondary school (p. 34). Buyers are primarily interested in buying drugs for personal use, gamma aminobutyric acid (GABA) to assist with the negative effects of stimulants or etizolam for self-medication for mental health issues (Van Hout & Hearne, 2017, p. 107). Students buy study drugs, such as modafinil, to improve memory and recall because students believe they need to completely focus on what is in front of them and find the drugs help avoid distraction (Bancroft, 2020, p. 86). However, there is a risk of neglecting ones health, such as forgetting to eat, drink, or do anything other than the task they set themselves up for (p. 86).

Similar to vendors, buyers show they have experience and knowledge of the drugs they purchase (Van Hout & Hearne, 2017, p. 106). Without the research, buyers would miss how to make the intoxication most effective and have suboptimal experiences. Some common places buyers learn from are in message boards, dark web discussion forums and during the interactions between users (Bancroft, 2020, p. 89). Buyers are expected to be able to look out for themselves for both scams and ensuring their own safety from overdosing.

The effort the user puts in to installing Tor and PGP, acquiring cryptocurrency, and use of false postal addresses is recognized as a potential deterrence for impulsive buying and excessive drug use (Hout & Bingham, 2013, p. 527). Shipping can take a significant amount of time and act as another potential deterrence. There are few cases of negative drug use experiences where users describe nausea, vomiting and severe intoxication (p. 527).

Safe usage sites

There are many resources on safe drug use on the internet. Sites such as Psychonautwiki lists most of the drugs sold on DNMs and can explain things like the chemical makeup, doses, thresholds, experiences, and the legal status of the drug (Psychonautwiki, 2020). The dark web offers many forums that instruct the user on the safe drug usage for specific drugs including dose, likely effects, drug interactions, duration, and method of intake. These DNM forums show active engagement in threads with tens of thousands of visits and it is believed there is a positive response to the threads (Caudevilla, 2019, as cited in Bradley, 2019, p. 25). Many sites will recommend

that beginners start with smaller doses to prevent overdoses. This will hopefully

minimizing the risk of drug use for new buyers and offering a higher likelihood of having

a more pleasant experience. It would encourage future drug use and repeat customers

to continue buying from DNMs.

Risks to Markets

One of the risks vendors pose to the markets are exit scams. Once they have

enough reviews for bigger buys, the vendors may take all the money from orders that

they have yet to send, and pull out of the market. Due to this risk, itis common for DNMs

to have a one-time fee to register as a vendor to discourage vendors from scamming

buyers as soon as they enter the market and encourage the vendor to stay until they

have made a profit. DNMs discourage buyers from buying bulk orders unless the vendor

is someone who has been at the site for a long time and has extremely high ratings

from buyers (White House Market, 2020).

Escrow is becoming increasingly common in markets to prevent scams from

vendors. Escrow allows the market to hold the money until the product has reached the

buyer, giving time for the vendor to send the product and the buyer to receive it

(Bradley, 2019, p. 6). If the buyer does not receive the product, the buyer should reset

the auto release on the order to keep their money in the wallet. Once the buyer has the

order, the money can be released from escrow. This does not help buyers or vendors if

the DNM itself decides to exit scam with all the money.

Half Finalize Early is an option that allows the vendor to receive half their pay

upfront and the other half when the buyer receives their product. This is not

recommended by the market because the market cannot ensure the buyer does not get scammed. Finalize Early (FE) is likewise unrecommended by markets because of the heightened risk to buyers and the possibility they will lose their money (Bradley, 2019, p. 6).

A distributed denial of service (DDoS) attack is when multiple systems flood the bandwidth and resources of a targeted system. Most DNMs have basic protections against DDoS attacks by using captcha verification and time limits. DNMs are transitioning to using pretty good privacy (PGP) as a way to verify identity and strongly urging users to start doing the same. PGP's primary functions are to verify a user's identity, offer secure communication and to decrease the amount of fraud using the name of the market. PGP is regularly updated on the White House Market (WHM) to ensure users are on the right site and not a fake site.

PGP allows for vendors and buyers to communicate privately without the market knowing the address of the buyers by using encryption. Private communications are encouraged for personal information once it is decided a sale will take place. The buyers go to markets because vendors will be less likely to try and simply take the buyer's money and leave. Escrow is there to prevent that from happening. It is easier to access many items and services than have a limit to what a single vendor is capable of providing.

White House Market

The WHM is a DNM site that has over 15,000 listings, 1,000 vendors, and 37,000 active customers (White House Market, 2020). Fraud protection varies from site to site.

WHM's policy is that if a product does not reach the buyer, the buyer is encouraged to start a dispute and reset the auto release on escrow to protect the buyer's money (White House Market, 2020). Intervention by law enforcement is a normal risk that vendors and buyers alike take for the sale of drugs. Some vendors will guarantee a 50% refund or reshipping the product if there is tracking (White House Market, 2020). The buyer is expected to ask the vendor for specifics because it is no longer under the market's jurisdiction. The market is there to minimize the amount of scams between vendors and buyers. A number of vendors allow another purchase of the same product for half price of the original, while others do not offer that deal. The cryptocurrency the WHM uses is Monero (White House Market, 2020).

A major DNM based in the Netherlands named Hansa banned fentanyl in an effort to become a lower priority for law enforcement (Bradley, 2019, p. 218). DNMs will generally ban child or animal pornography, assassination, terrorism related products, weapons, and fentanyl as a compromise with law enforcement. So long as DNMs are not high priority, law enforcement will be less interested in them and focus on more pressing issues, such as deciding to stop assassinations rather than person drug use. Dream Market does not allow assassination, weapons, poisons, child pornography, and violent live action audio and visual recordings or images (Lane, Lacey, Stanton, Matthews, & Salmon, 2018, p. 282). Drugs dominate most DNMs because it is less likely to attract the attention of law enforcement.

Van Hout and Hearne (2017) found that the range of psychoactive substances in Valhallan and Alphabay marketplace significantly differ from each other with a few common ones such as etizolam, 2C-B and methoxetamine (p. 105). The WHM has

many of the same common options and varies on the specific make up of drugs. The

specific makeup of the drug is often in the description of the product rather than offered

as a category.

Cryptocurrency

The most common and well known cryptocurrency is bitcoin. Cryptocurrency is a

form of digital currency that works using distributed ledger technology, usually a

blockchain (Milutinović, 2018, p. 120). Cryptocurrencies are decentralized, meaning no

government or bank controls it and there is no server for transactions. Individual entities

process and control the cryptocurrency, every peer in the network has a list of

transactions that are confirmed by miners who spread the legit transactions across the

network (p. 120). Once the transaction is confirmed, nodes add the transaction to its

database.

Similar to stocks, the value of cryptocurrencies can wildly fluctuate, for example

Bitcoin had a change of nearly $6,000 over the span of two days at the end of 2017

(Yahoo Finance, 2020). Bitcoin is often used in illegal activity. Roughly a quarter of

bitcoin users are involved in illegal activity, with about $76 billion of illegal activity a year

involves bitcoin, that matches US and European markets for illegal drugs (Barone &

Masciandaro, 2019, p. 234). This is only one cryptocurrency, there are many more such

as Monero, Ripple, and Etherium.

Methods

Data were collected from the White House Market, because Silk Road 3.0,

Empire, and Grey Market were shut down on January 6, 2020 when data collection

began. Data was taken from the White House Market (WHM) for 14 days from January

6, 2020 to January 19, 2020. Dark net markets are prone to shut down without warning;

therefore data were collected over only a short time period of time without interruptions.

The data collected area snapshot of the White House Market.

There were a total of 1182 entries upon completion of data collection with 986 of

them drug entries. Entries of the same product by the same seller at the same price put

into multiple different categories were not included because the user is only ensuring

that their product is seen by spreading across as many categories as they possibly can.

It is likely that the goal was to bump the product to the front page. There is the

possibility that the new post is because a new shipment is ready for sale, however, it is

assumed that is not the case for the majority of products. When products have different

names and pictures but the same amount and price, they were included. The difference

between an ecstasy pill of 220 mg Golden Kenzo and ecstasy pill of 220 mg Pink Red

Bull may simply be the shape and colouring, however, they are marketed as different

products so they are treated as such. After data were cleaned there was a total of 964

drug cases. This study focuses exclusively on drug cases, all other types of sales were

removed.

Price was recorded in USD, there are minor variations in the price because

cryptocurrency changes value from minute to minute while it took two weeks to

complete data collection. Prices were available in Euro, USD, CAD, Pound Sterling, and

AUD. The currency would then be translated into XMR when someone buys. This prevents the large discrepancy from the intended price to the price paid.

Categories were refined based on the class and effect of the drug while the nuances of the specific make up and percentage was lost because the majority of vendors do not list the purities of the drug. Ecstasy and 3,4-methylenedioxymethamphetamine (MDMA) are listed separately because Ecstasy in the U.S. often contains little to no MDMA (Palamar, 2016, para. 9). There is no consensus in the literature on drug categories in DNMs. The category and type of drug was sorted in effect and classes so the specific makeup and nuances of each item were lost.

Results

Of the 1182 number of total cases, drugs make up for 83% of the items sold on the WHM. Baravalle, Sanchez Lopez, and Sin Wee Lee (2016) found similar results, specifically that 80% of the products for sale on the Agora market were drugs related items (p. 353). The focus here is only those 964 drug cases that have been cleaned.

Market structure

Before a user is able to start on the completely automated public Turing test to tell computers and humans apart (CAPTCHA), a box outlined in red will appear if the user's JavaScript is enabled. It tells the user to go into about:config to change javascript.enabled to false. Once the user has done that and refreshed the page, the box will disappear. Disabling JavaScript decreases the number of ways a user can be

attacked. It can clue users in that a site is fake if it asks users to enable JavaScript once they have disabled it.

The structure of the WHM is made to protect against cyberattacks. Figure 1 has a lock above (Pop-up) News and Announcements showing that an user can only close the pop-up and continue to the home page. The home page is available from all stages past the pop-up of news and announcements. The structure of the WHM is similar to the one made by Lane, Lacey, Stanton, Matthews, and Salmon (2018) on the Dream Market (p. 283-285). The WHM has additional CAPTCHA at areas that have to do with user accounts to prevent bots from making accounts to overwhelm the market and to make any attempts to guess the password and username with the use of bots extremely slow. Security is placed in similar places to protect the market and decrease vulnerabilities.

Figure 1: Flow Chart of Market Structure
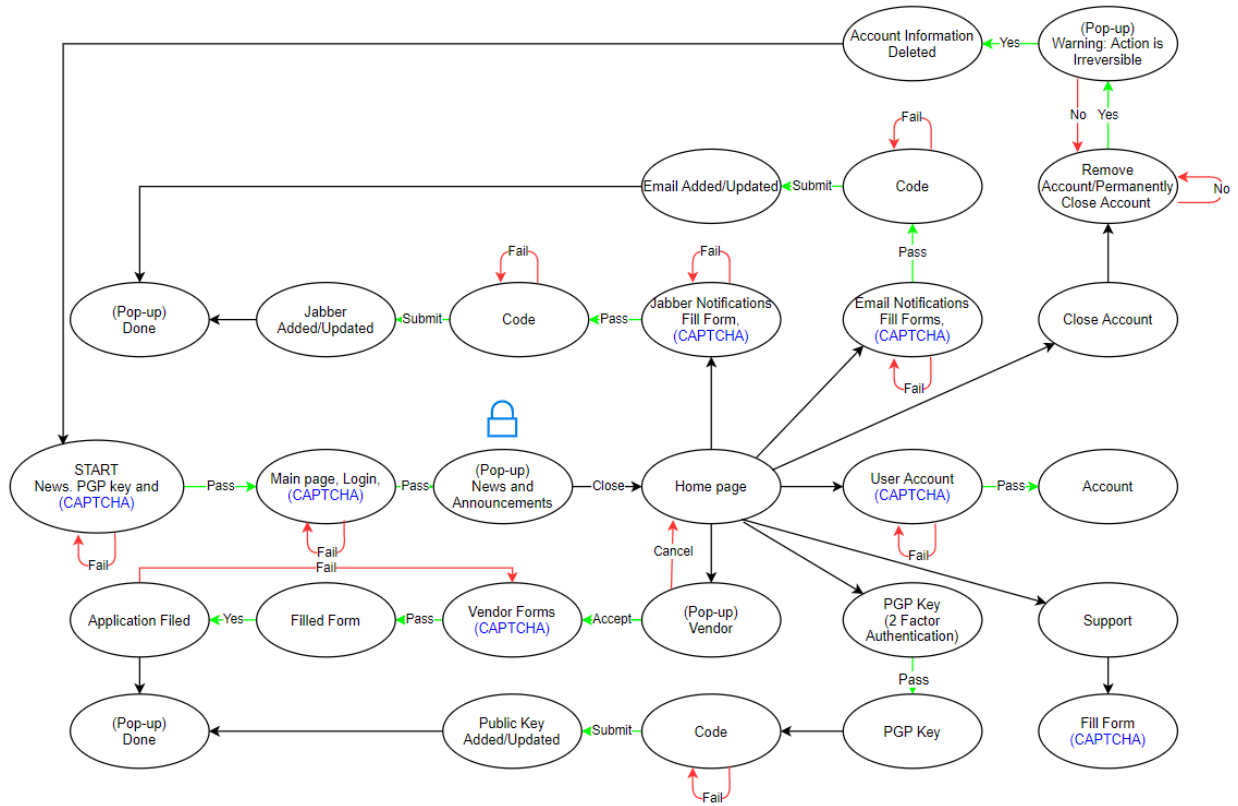
The goal is to make markets hard to navigate for bots, yet not confusing enough for humans to be discouraged from using the site. A balance between convenience and security that leans more towards security. Users would not be attracted to unsecure sites to do business, most users have enough technical knowledge to determine if the market would be easy to shut down.

Much of the communication on addresses is handled by PGP out of the market's communication system. This makes it more difficult for law enforcement to intervene and confiscate packages even during the takeover of a market. Obtaining the PGP keys of every major vendor and buyer is unviable for law enforcement. There will still be users who use the market's communication systems, however, the WHM is beginning to

require every user to have a secure PGP to be able to do more than look at the

products.

Price and category of drugs

The cost of cannabis, Ecstasy, psychedelics and precursors are disproportionate

to the amount on the market. One gram of cannabis is far more expensive than one

gram of Ecstasy. Precursors are substances that can be used to produce drugs. Most

buyers simply buy the completed product rather than try to make their own drug. There

is less a market for precursors than the ready to take drugs. LSD is classified under

psychedelics and the dose for LSD is significantly smaller than any other drug, and the

price rises proportionally. Ecstasy alone makes up for 36.08% of the amount of drugs

sold on the WHM. Stimulants is the next category of drug that has the second largest

amount in the WHM at 26.13% as shown in figure 2.

Figure 2: Types of Items Sold by Amounts.
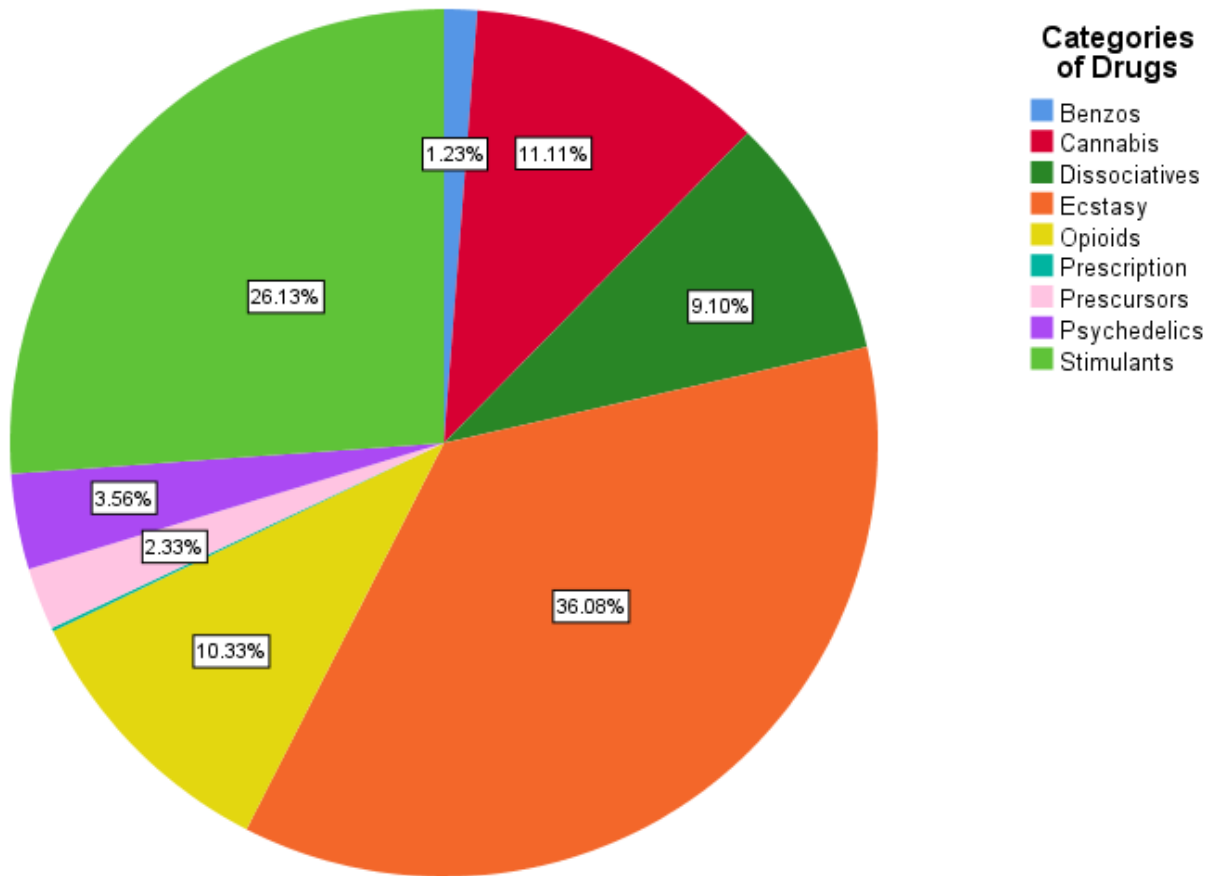
In figure 2, nine drug items were put up for sale in amounts of one kilogram that skews the data in favor of those specific drugs. Five drug orders are offered by one user for ketamine, MDMA, two types of heroin and cocaine going worldwide. Every drug sold in amounts of 500 grams or over are all in powder or pill form. Ketamine, ecstasy, heroin, cocaine, and speed are the only ones offered in amounts over 500 grams in a single order. The larger an order is, the more likely it will be caught by law enforcement. Smaller packages have many more options of transport than a kilogram of drugs, so orders are more likely to be smaller. Larger order can be packed into smaller packages, however, if three packages are going to one location and one package is found to have

drugs, the other two are much more likely to be found. Vendors and buyers would not

sell and buy in bulk if most orders would be caught. That is not an economically viable

way of conducting business, therefore, powders and pills have an easier time crossing

borders and avoiding the eyes of customs.

Figure 3: Types of Items Sold by Price.
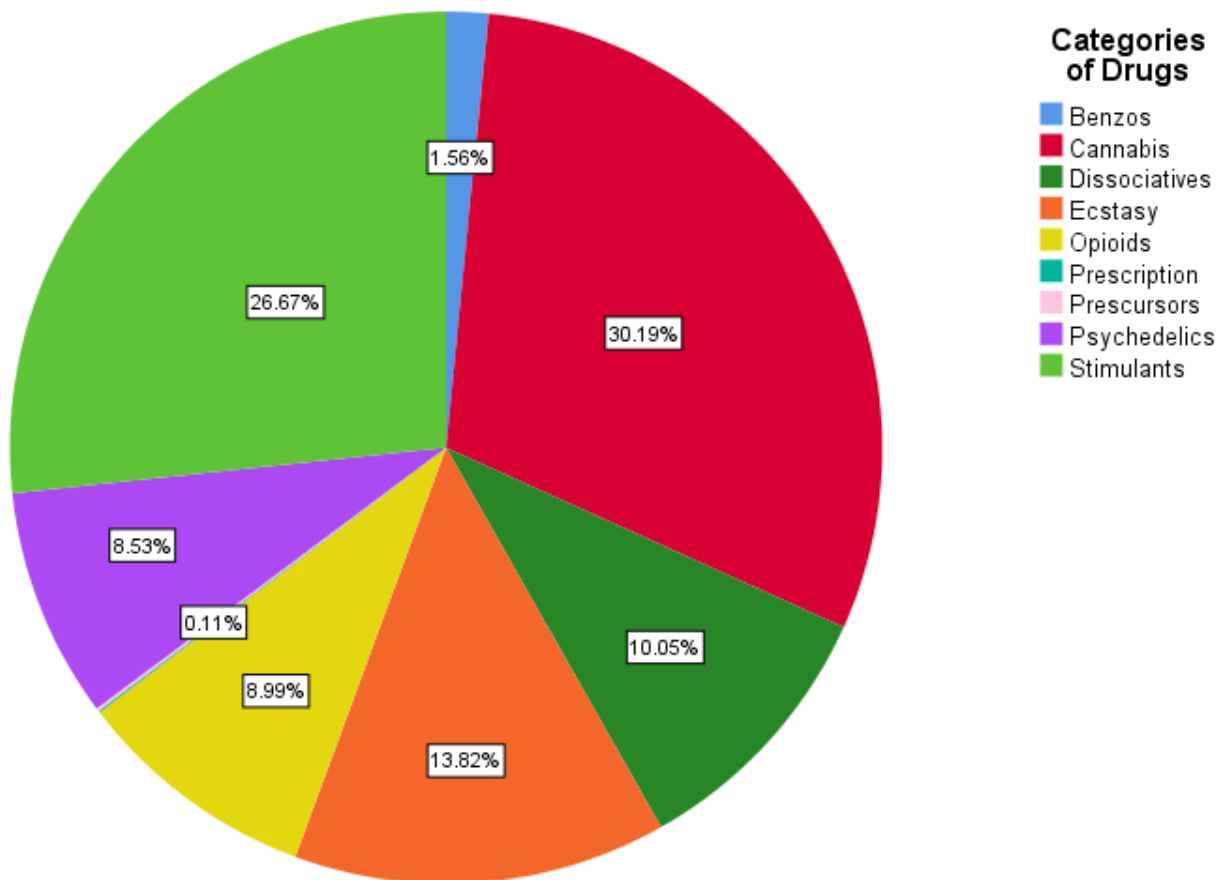
Figure 3 outlines the difference in cost of the categories of drugs when compared

to figure 2. Ecstasy makes up for only 13.82% of total price when it is 36.08% of total

amount on the market. Cannabis is in the opposite position, making up 30.19% of total

price compared to making up 11.11% of the amount on the market. Stimulants are

almost perfectly proportional at 26.67% price to 26.13% amount on the market.

Destination and origin countries for shipping

Figure 4: USD Flowing from Destination Countries
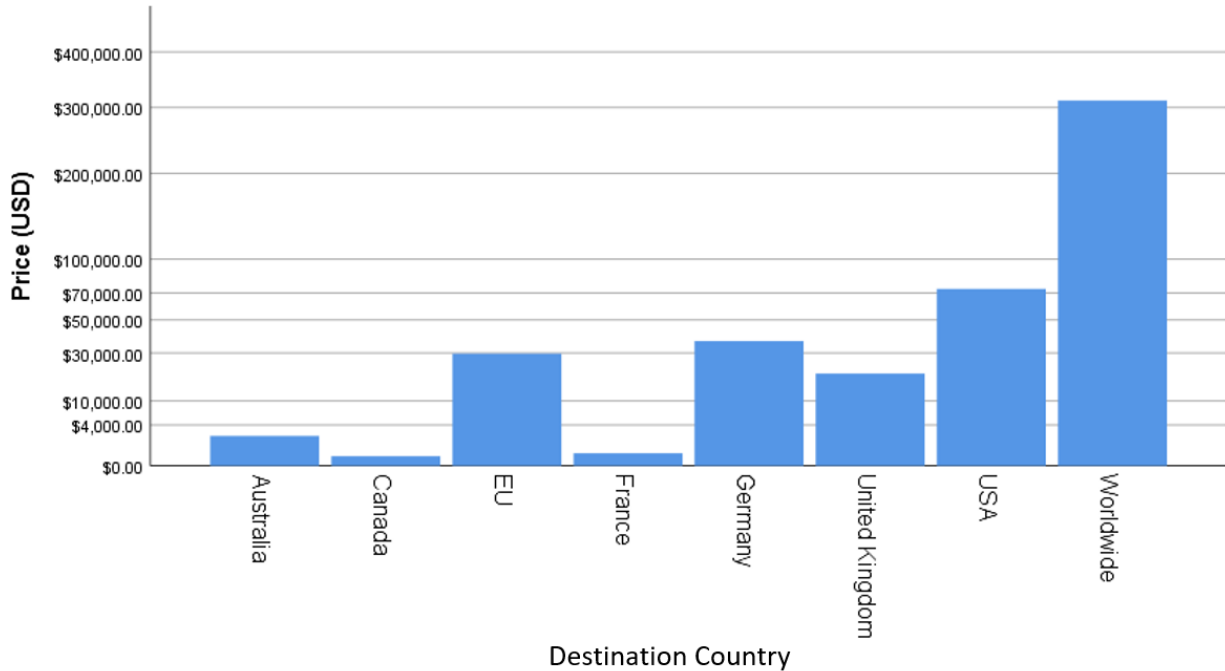
Figure 4 shows that worldwide is the most popular destination, with over

$300,000 worth of orders having the potential to go worldwide. Buyers could be

anywhere in the world that mail packages can reach. The USA is the country that has

over $70,000 worth of drug orders that can go worldwide. The greatest amount of

money is flowing to the Netherlands, about $175,000, followed by the United Kingdom

then the USA. The Netherlands has one vendor that sells nine large drug orders, four

that are 500 grams and five that are one kilogram, worth $125,939.31 in USD. The USA

sells about $75,000 worth of drug orders.

Figure 5: USD Flowing to Countries of Origin
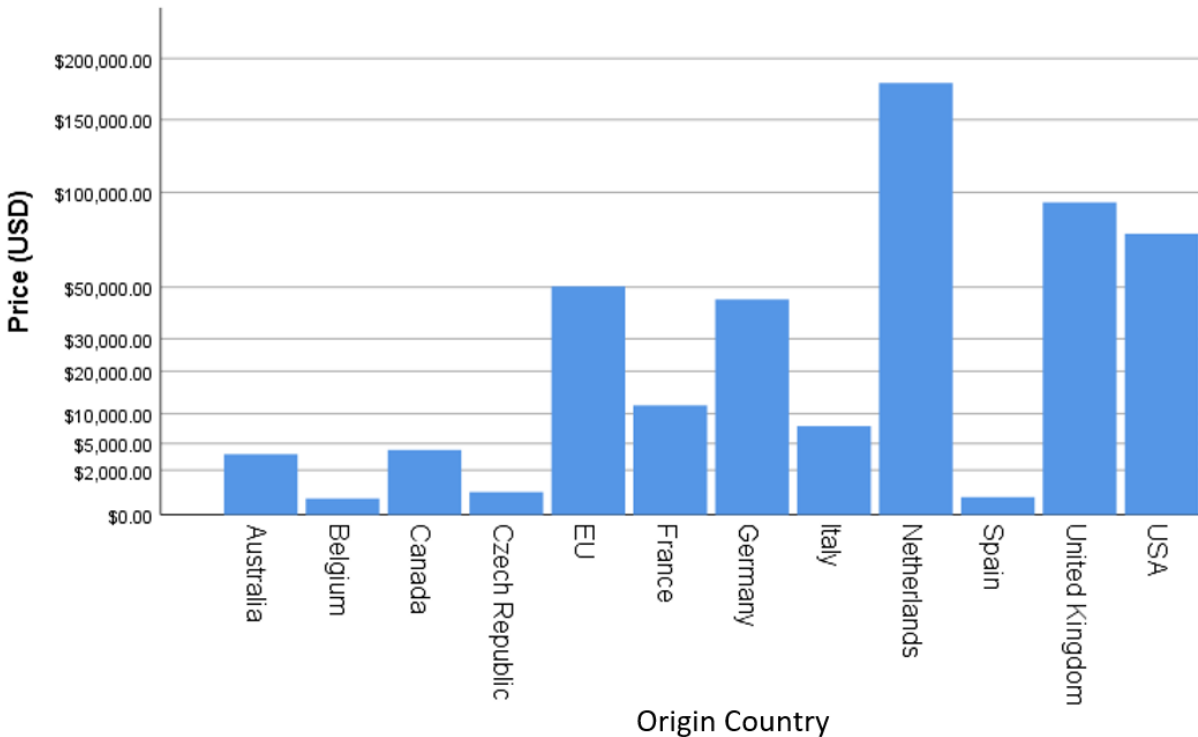
Figure 5 depicts the amount of money going to countries of origin. The greatest

amount of drugs is coming from the Netherlands, followed by Germany. These two are

the countries that offer the greatest amount of drugs by far. There is a significant

difference between the EU and Germany. Germany has about three times the amount

of drugs flowing from it than the EU. The EU still has more money flowing to it then

Germany does. The EU is a collection of many countries that have a more open trade

agreement than other countries.

Belgium, the Czech Republic, and Spain offer a much smaller amount of drugs

compared to other countries. Spain only has three vendors that offer a total of 13

orders. Each vendor has an area of specialization such as cannabis, Ecstasy and 2C-B,

or DMT. The Czech Republic only has one vendor who has one product, 2C-B, offered

in four different amounts. Belgium only has one vendor who sells one product, meth, to

the EU.

Figure 6: Amount of drugs from countries
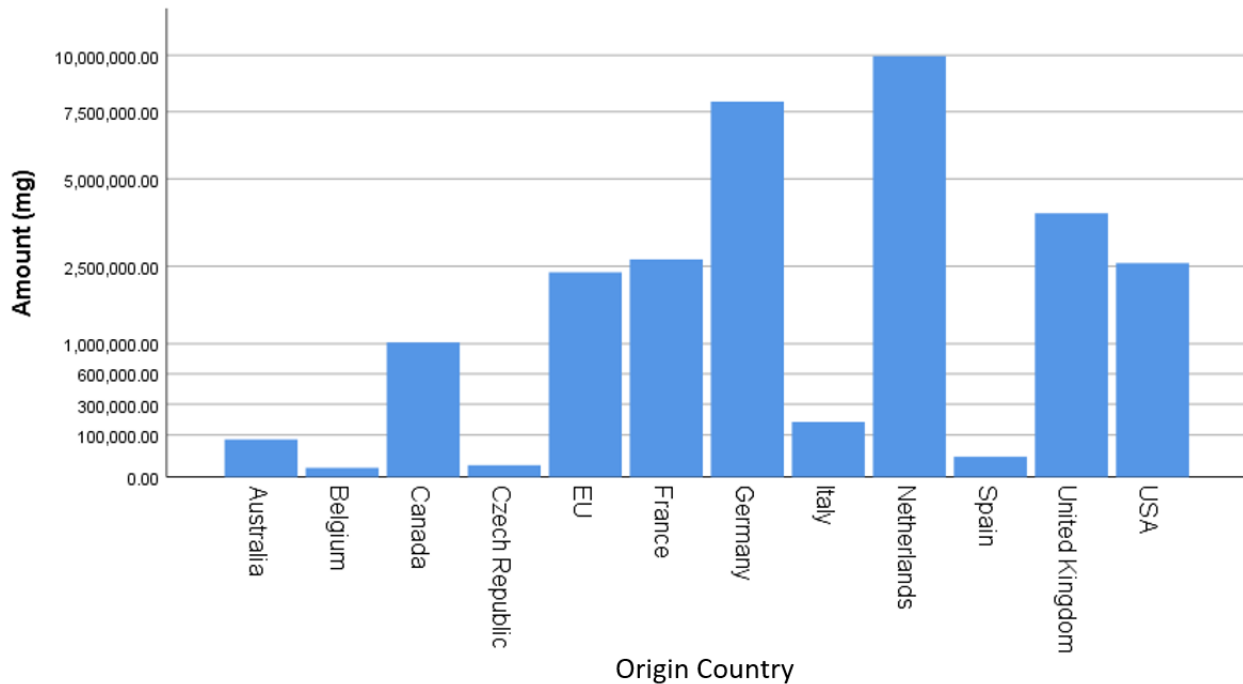
Figure 6 shows that the Netherlands supplies the greatest amount of drugs

compared to any other country. It is followed by Germany, the United Kingdom, and

France, all member countries of the EU. Belgium, the Czech Republic, Spain, France,

Netherlands and Italy are all part of the EU so it can be inferred that anything going to

the EU is able to access those countries. All products that originate from the Czech

Republic ship worldwide rather than only to the EU. Germany is also part of the EU, yet

still has a category of its own. This shows that there is a difference between shipping to

Germany and shipping to the EU. The amount of drugs orders that can go to Germany

is greater than the amount going to the EU.

Figure 7: Amount of Drugs to Countries
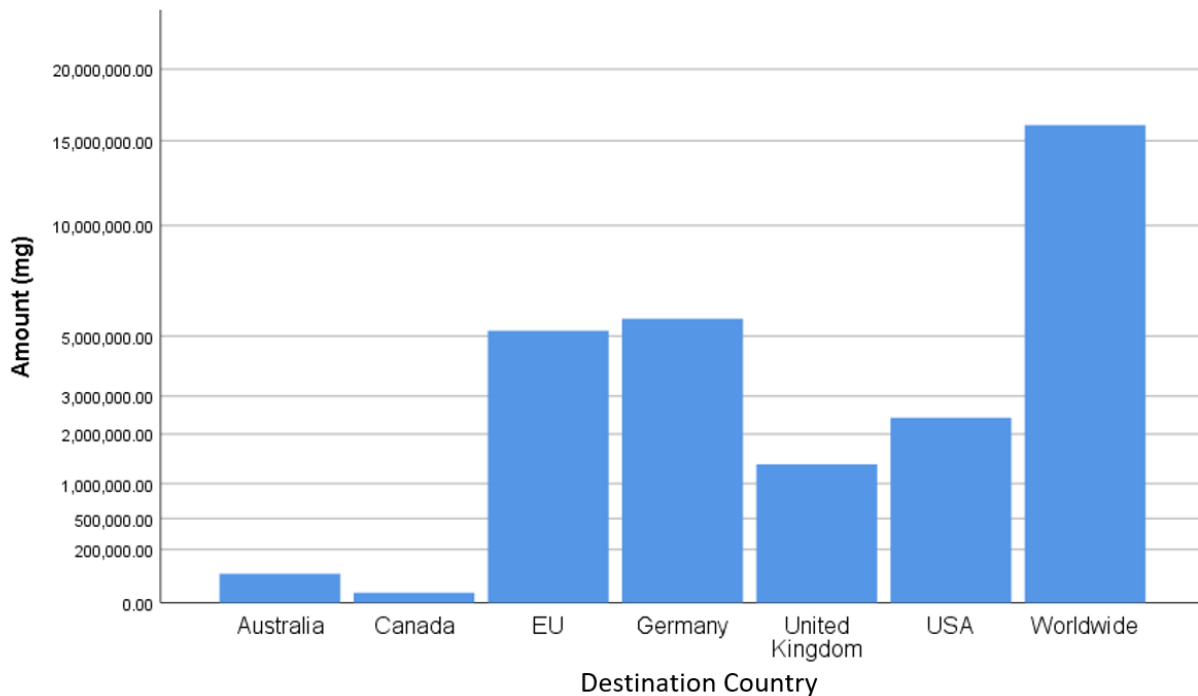
The only country that ships exclusively to Canada is Canada itself. Australia,

Germany, the United Kingdom, and the USA are all the same. Orders that ship

exclusively to those countries are the countries themselves with the exception of three

orders shipping to the EU from the USA. Many orders that go worldwide have different

refund and reship policies depending on which country the vendor has to ship to. Some

vendors will allow a 50% refund if there is tracking on the order to any country. Others

will only allow any type of refund and reship if the package is tracked and going to the

origin country because of the increased risk of the package being caught at the border.

Vendors are able to use tracking as an additional security to ensure the buyers do not

withhold the money in escrow while getting the package. Some vendors admit that if

tracking is not selected, they also do not know what happens to the package once it is

shipped.

Table 1: Orders from Origin Country to Destination Country

Count		Destination Country								Total
		Australia	Canada	EU	France	Germany	United Kingdom	USA	Worldwide	
Origin Country	Australia	24	0	0	0	0	0	0	9	33
	Belgium	0	0	1	0	0	0	0	0	1
	Canada	0	2	0	0	0	0	0	14	16
	Czech Republic	0	0	0	0	0	0	0	4	4
	EU	0	0	2	0	0	0	0	94	96
	France	0	0	38	2	0	0	0	2	42
	Germany	0	0	22	0	95	0	0	3	120
	Italy	0	0	38	0	0	0	0	0	38
	Netherland	0	0	3	0	0	0	0	178	181
	Spain	0	0	0	0	0	0	0	13	13
	United Kingdom	0	0	35	0	0	67	0	124	226
	USA	0	0	3	0	0	0	154	27	184
	Worldwide	0	0	0	0	0	0	0	10	10
Total		24	2	142	2	95	67	154	478	964

Table 1 shows that 49.59% of orders will ship worldwide while 50.10% ship domestically, if orders from member countries of the EU shipping to the EU can be considered shipping domestically. The remaining three orders ship from the USA to EU, a abnormality since it implies that those orders can only ship to the EU from the USA yet cannot ship worldwide. This allows an easier flow of drugs in the member countries of the European Union. Many vendors in member countries of the EU ship to the EU, but find it difficult to ship orders worldwide. France, Germany, and Italy in particular find it difficult to ship outside of the EU or within their country of origin. International borders present a challenge for small and large vendors. One of the largest vendors only ship within their country of origin while small vendors with only one available order are able to ship worldwide. The ability to ship worldwide may just come down to the method of shipping and the tricks vendors learn.

Vendors

There are 112 vendors who listed a drug product during the time of data collection. 65 (58%) vendors sell one type of product, such as MDMA, LSD, or cannabis buds. 18 (16%) vendors sell more than three types of drugs. There are 28 (25%) vendors who sell two or three different types of drugs. The small vendors who only sell one type of drug are more limited in scope and are more likely to be creating the drug themselves with a small or no support system. The vendors who sell many different types of drugs in large amounts are far more likely to have a large support system that allows them to produce those drugs and ship them worldwide.

Vendors that have products sold in many categories indicate a large support network that is capable of supplying a customer base. This could mean the vendor is part of an organized crime group, or has the capabilities to make and distribute large amounts of products and services. Six vendors sell 18 orders of products over 500 grams. Only two of them are able to send orders worldwide. The others are restricted to conducting business within the country of origin or as a member country of the EU going to the EU. There is only one order of pills out of the 18 products sold in amounts over 500 grams, 17 products are in powder form.

A handful of drug vendors say they sell from worldwide. This is particularly strange when the rest of the vendor's operations have been from one place. This was likely a mistake on the part of the vendor. Vendor 62 has 41 listings, 39 of them originating from the United Kingdom. 11 of Vendor 62's listings go to the United Kingdom, 28 go to the EU, and two go worldwide. There is no significant difference in

the price or product that goes to the EU rather than the United Kingdom. There is a large difference in price when going worldwide. Seven grams of MDMA going to the UK costs $62.29. Seven grams of MDMA going worldwide costs $150.18, over double the price.

Vendor 10 shows similar differences in price between shipping locally and worldwide, if not quite as steep a hike in price. Vendor 10 ships from Canada and the cost of buying three and a half grams of MDMA is $120, averaging out to $34.29 per gram. Shipping worldwide for MDMA costs $38 per gram, a difference in $4 a gram from shipping to Canada.

Vendor 39 has a strange combination of countries of origin and destination countries. It ships from the United Kingdom and the USA to the EU and the United Kingdom. Only MDMA comes from the USA, costing $45 for 3.5 grams and $150 for 14 grams. Much higher than the average price per gram than what Table 2 shows is the average price of MDMA on the WHM at $5.20 per gram. Vendor 39 does not ship to the USA. This could be a group of two or more individuals that work together to supply drugs from different places.

Vendor 83 sells meth for $63.69 a gram going worldwide from the Netherlands. The same product going from Belgium to the EU is $57.63 a gram. These prices are far above the average cost for a gram of meth. Vendor 83 only has two orders listed with the same product so it is less likely than vendor 39 that it is a group. It may be a shipping technique since the Netherlands have a higher rate of shipments going worldwide than other EU member countries. The customs in the Netherlands could be

more lax so packages have a higher chance of success going from the Netherlands to worldwide than other EU countries. This implies there is an internal screening process for packages leaving the EU that is more relaxed in the Netherlands, allowing for a higher rate of successful shipping from the Netherlands that encourages vendors to sell worldwide.

Vendor 109 ships Ecstasy from the USA to the USA for $1.10 a gram. MDMA is shipped from worldwide to worldwide for $8.25 a gram. The average cost for Ecstasy per gram on the WHM is $6.36 while the average cost of MDMA is $5.20. Vendor 109 follows the trend that packages that ship to worldwide are more expensive than locally shipped packages. All vendors that ship both locally and worldwide have shown that worldwide shipments are more expensive than local shipments. Only five vendors have been found to ship both locally and worldwide on the WHM so caution should be used when generalizing.

63% of the drugs coming from Canada are cannabis buds and flowers sold by four different vendors, all cannabis products going worldwide. 37 out of 38 sales from Italy are from one vendor. 34 of those 37 sales are cannabis buds and flowers. There is a strong market for cannabis products. The average cost of one gram of cannabis buds and flowers is $7.77. Concentrates such as live resin, shatter and vape oil average $64.16 a gram. There are a total of 143 orders of cannabis buds and flowers. Of those, only 25 orders go worldwide, 17.48% of all orders. Cannabis concentrates have a total of 106 orders with 52 of them going worldwide, 49.06%. There are more orders of buds and flowers, yet it is more difficult for it to cross borders. One reason is that cannabis

can be bulky and more difficult to hide compared to a few dozen pills, a few grams of

powder, or a few milliliters of oil.

Shipments going worldwide will cost more than local shipments because of the

heightened risk and increased odds tracking and a refund or reshipping will be

requested. The vendor needs to make a profit and migrate the risk of multiple buyers

requesting a refund because their package did not arrive. One way is to increase the

price to match the risk taken. It becomes more economical for buyers to choose

vendors that ship locally because there is a lower chance of the package being

intercepted and it is often cheaper. There are still reasons for buyers to buy from a

specific vendor to ship worldwide, such as higher ratings, better reviews, and more

options in choice of drug.

Figure 8: Type of Drugs by Price and Amount
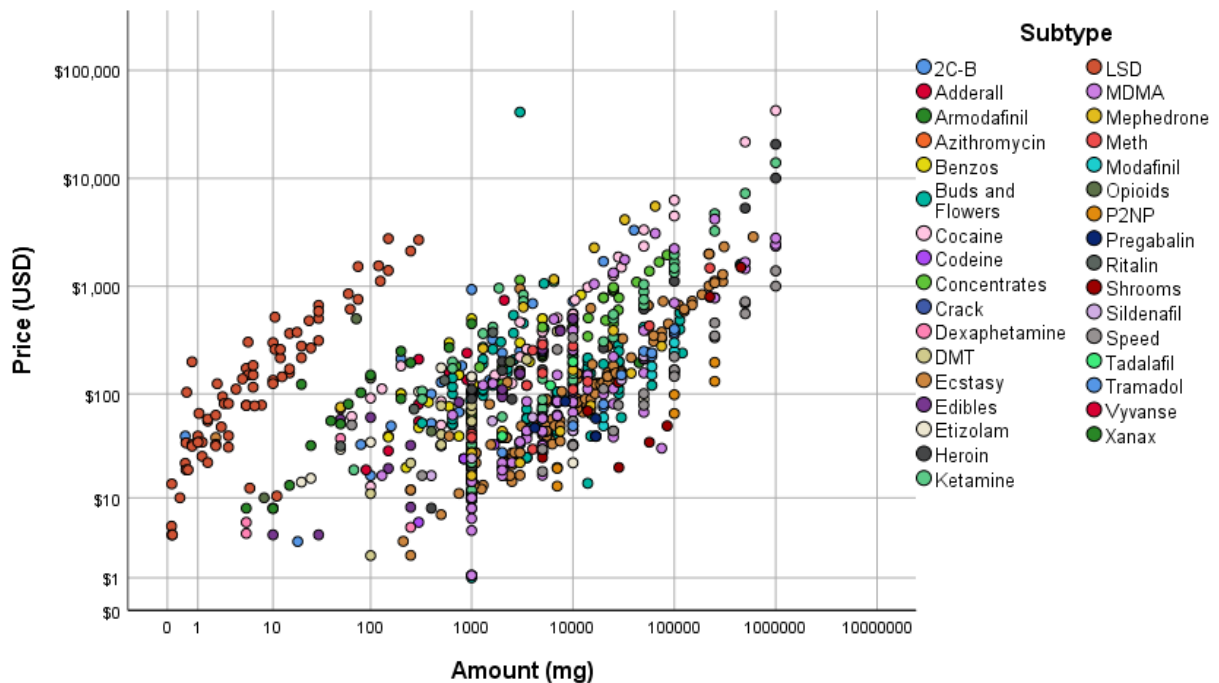
It should be noted that units in figure 8 increase logarithmically with every increment to better show the amount of drugs and cost. The most common amount offered in an order is one gram. MDMA is the cheapest drug while LSD is the most expensive. The cannabis buds and flower that costs $41,069 for 3 grams is very likely because the vendor ran out of the product and increased the price to the point no one would buy it.

Drug doses and price

Table 2 was created by taking information on the average common dose by individuals who have used the drug found from Psychonauts (2020). The order of cannabis buds and flowers that costs $41,069 for 3 grams has been taken out. Vyvanse is the most expensive drug per common dose at $12.03, followed by Ritalin at $7.49 and Adderall at $6.12. Vyvanse, Ritalin and Adderall are stimulants that increase attention span and decrease restlessness (Drug Bank, 2020). All are commonly used to treat attention deficit hyperactivity disorder and used by students as smart drugs to study and focus. The three most expensive drugs per dose are used to focus rather than check out of reality.

Table 2: Price of Drugs and Doses

Drug	Price (USD) per gram	Common Dose (mg)	Price (USD) per Dose	Mean Price (USD)	Mean Amount (gram)
2C-B	$80.64	20	$1.61	$304.51	3.78
Adderall	$203.97	30	$6.12	$81.36	0.40
Armodafinil	$4.33	150	$0.65	$195	45.00
Azithromycin	$11.11			$50	4.50
Benzos	$116.32	1	$0.12	$219.72	1.89
Buds and Flowers	$7.77	83	$0.64	$151.63	19.51
Cocaine	$43.21	45	$1.94	$2,319.34	53.68
Codeine	$34.20	125	$4.28	$30.78	0.90
Concentrates	$64.16			$735.11	11.46
Crack	$51.12	45	$2.30	$189.15	3.70
Dexaphetamine	$34.76			$25.03	0.07
DMT	$68.38	30	$2.05	$93.74	1.37
Ecstasy	$6.36	107.5	$0.68	$266.33	41.89
Edibles	$41.69			$86.22	2.07
Etizolam	$3.11	1.5	$0.01	$68.59	22.08
Heroin	$14.62	27.5	$0.40	$1,728.38	118.19
Ketamine	$16.56	52.5	$0.87	$984.33	59.44
LSD	$13,133.47	0.1125	$1.48	$319.80	0.02
MDMA	$5.20	107.5	$0.56	$383.45	73.74
Mephedrone	$45.75	62.5	$2.86	$811.21	17.73
Meth	$8.78	22.5	$0.20	$247.37	28.18
Modafinil	$2.75	150	$0.41	$165	60.00
Opioids	$218.31			$130.11	0.60
P2NP	$0.73			$87.27	119.00
Pregabalin	$3.35	412.5	$1.38	$44.55	13.30
Ritalin	$246.82	30	$7.40	$153.03	0.62
Shrooms	$2.18			$191.64	87.79
Slidenafil	$5.79			$80.28	13.86
Speed	$1.52	30	$0.05	$291.23	191.22
Tadalafil	$2.00			$120	60.00
Tramadol	$4.10	175	$0.72	$205	50.00
Vyvanse	$267.23	45	$12.03	$320.67	1.20
Xanax	$639.77	1	$0.64	$113.24	0.18

Table 2 shows that etizolam is less than half a cent per dose, by far the cheapest compared to other options. It is a depressant that treats anxiety and sleep disorders (Drug Bank, 2020). Speed, benzos and meth cost $0.05, $0.12 and $0.20 per dose respectively. The street price of meth for a single dose costs about $5 (Bezrutczyk, 2019, para. 19). Meth is cheap to a worrying degree compared to the street price. The street price for buds and flowers cost $19.75 for low grade from Arkansas, the state with the lowest price (Bezrutczyk, 2019, para. 4). The average cost per gram on the WHM is $7.77. The average street price for heroin in 2016 was $152 per gram, the WHM averages $14.62 per gram (Bezrutczyk, 2019, para. 10).

17 (70%) out of 24 drug prices per common dose are under $2. 37.5% of drug prices per dose fall between $0.40 and $0.90. Ecstasy is used to refer to MDMA, however, much of the Ecstasy in the USA is mixed with drugs such as cocaine, ketamine and methamphetamine (Palamar, 2016, para. 9-11). MDMA costs less than Ecstasy by just over a dollar per gram. The drugs offered are more pure for cheaper.

Table 3 shows that Germany has a significant number of orders of Ecstasy being sold from it. Over half (50.83%) of the drugs orders from Germany are of Ecstasy. 41 (36.28%) of 113 total orders of Ecstasy are shipped to Germany. Cannabis has the greatest number of orders, the majority of them subtypes of buds and flowers. All the precursors are from the United Kingdom going worldwide. The United Kingdom has the most (23.20%) drug orders flowing from it of any country. Precursors can be used to gain the trust of buyers and differentiate the vendor from other vendors with similar products.

Table 3: Origin Country for Type of Drug

Count		Australia	Belgium	Canada	Czech Republic	EU	France	Germany	Italy	Netherlands	Spain	United Kingdom	USA	Worldwide	Total
														Country of Origin	
Category of Drug	Benzos	0	0	0	0	7	1	11	0	0	0	36	4	0	59
	Cannabis	7	0	10	0	20	2	6	34	0	4	117	100	1	301
	Dissociatives	0	0	0	0	6	5	8	0	25	0	0	2	5	51
	Ecstasy	0	0	2	0	21	12	61	0	82	3	11	12	4	208
	Opioids	6	0	0	0	0	4	1	0	13	0	11	6	0	41
	Prescription	0	0	0	0	0	0	4	0	0	0	0	3	0	7
	Prescursors	0	0	0	0	0	0	0	0	0	0	6	0	0	6
	Psychedelics	14	0	2	4	19	2	12	3	44	6	0	37	0	143
	Stimulants	6	1	2	0	23	16	17	1	17	0	42	20	0	145
Total		33	1	16	4	96	42	120	38	181	13	223	184	10	961

Table 4: Destination Country for Category of Drug

		Australia	Canada	EU	France	Germany	United Kingdom	USA	Worldwide
									Destination Country
Category of Drug	Benzos	0	0	1	0	11	5	3	39
	Cannabis	7	0	61	2	6	33	91	101
	Dissociatives	0	0	5	0	8	0	2	36
	Ecstasy	0	1	37	0	41	7	9	113
	Opioids	1	0	7	0	1	2	4	26
	Prescription	0	0	0	0	4	0	2	1
	Prescursors	0	0	0	0	0	0	0	6
	Psychedelics	10	0	6	0	11	0	31	85
	Stimulants	6	1	25	0	13	20	12	68
Total		24	2	142	2	95	67	154	475

Table 5: Price of Drug Type

Count		Benzos	Cannabis	Dissociatives	Ecstasy	Opioids	Prescription	Prescursors	Psychedelics	Stimulants	Total
						Drug Type					
Price Groups	$1.00-4.99	0	3	0	7	0	1	0	5	4	20
	$5.00-19.99	11	17	7	25	6	0	2	13	11	92
	$20.00-49.99	17	60	6	48	5	2	0	33	19	190
	$50.00-99.99	7	58	5	39	7	4	2	26	25	173
	$100.00-399.99	19	100	14	53	16	0	2	43	53	300
	$400.00-999.99	5	33	9	16	3	0	0	13	17	96
	$1000=<	0	27	10	20	4	0	0	10	16	87
Total		59	298	51	208	41	7	6	143	145	958

Cannabis has the greatest amount of orders for it on the WHM. 33.6% of cannabis orders fall between $100 and $399.99. The price range between $100 and

$399.99 is the most popular with the greatest number of orders in benzos, cannabis, dissociatives, ecstasy, opioids, psychedelics and stimulants to fall in. 49.58% of the orders fall under $100. 9.01% of orders cost over $1000, these are typically prices not meant for the average buyer for personal use.

It would be beneficial for future research to create a comparison in habits of consumption between DNM users and individuals who use street drugs. It can give insight into the question if DNM drug users have a lesser chance of overdosing because they have more knowledge in the makeup of drugs and the drugs found on DNMs are more pure than street drugs.

Limitations

During data collection, Australia had a large wildfire which may have impacted the products going from and to Australia because there could have been disruptions to the delivery system in some parts of Australia. Another limitation is that it is common practice for vendors to inflate the price of a product beyond what people are willing to pay when vendors run out of stock (Christin, 2013, as cited in Bradley, 2019, p. 5). This allows vendors to keep the reviews for the item rather than having to start over. It can misrepresent what was on the WHM during the time of collection and the price of products.

Buyers can buy more than one order of a drug and vendors are often able to send more than one order of drugs. The price and amount of drugs flowing between countries should only be used to gain an idea of the transactions and flow of drugs between countries. This study assumes that each order is shipped once. Some vendors

are not specific in listing the drug they sell and others extremely specific in labeling

designer drugs. The White House Market is a relatively small market and the extent this

market can be generalized to other dark web markets and should be examined.

Conclusion

There are differences in the cost of buying products that ship worldwide

compared to products that ship locally. Overall shipping worldwide offers are more

expensive. The country of origin also impacts the vendor's ability to ship worldwide.

Some countries, such as Canada, the Netherlands, and the Czech Republic, have a

higher percentage of worldwide shipments. This may be due to certain customs

practices that allow for ease of access to the global market and less restrictions or

screening, leading to less risk of a package being intercepted by law enforcement.

Vyvanse, Ritalin, and Adderall are the most expensive drugs by dose, the three

of them are stimulants typically prescribed to treat ADHD. Etizolam is the cheapest by

dose, costing less than half a cent. Cannabis has the greatest number of orders

followed by Ecstasy. Prices on the WHM are significantly cheaper than the street price.

DNMs are safer alternatives to the streets to buy drugs from. The drugs are more likely

to be pure on DNMs and there is a significantly decreased chance of physical violence

(Barratt, Ferris & Winstock 2016, p. 27). Buyers and vendors know the specifics of

drugs and have many resources to safe use sites to guide newcomers (Van Hout &

Hearne, 2017, p. 106).

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