



Forensic drug intelligence and the rise of cryptomarkets. Part I: Studying the Australian virtual market



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ARTICLE INFO

Article history:

Received 29 May 2017

Received in revised form 6 August 2017

Accepted 18 August 2017

Available online 12 September 2017

Keywords:

Cryptomarkets

Supply and demand

Illicit drug market

Australian perspective

Darknet

ABSTRACT

Analysing and understanding cryptomarkets is essential to become proactive in the fight against the illicit drug trade. Such a research seeks to combine a diversity of indicators related to the virtual (*darknet* markets) and physical (the traditional “offline” market) aspects of the illicit drug trade to provide information on the distribution and consumption as well as to assess similarities/differences between the virtual and physical markets.

This study analysed data that had previously been collected on cryptomarkets from December 2013 to March 2015. In this article, the data was extracted from two marketplaces, *Evolution* and *Silk Road 2*, and analysed to evaluate the illicit drug trade of the Australian virtual market (e.g. information about the supply and demand, trafficking flows, prices of illicit drugs and market share) and highlight its specificities.

The results revealed the domestic nature of the virtual Australian illicit drug trade (i.e. Australian sellers essentially ship their products to local customers). This may explain the coherence between supply and demand. Particularly, the virtual Australian illicit drug trade is dominated by amphetamine-type substances (ATS), mainly methamphetamine and 3,4-methylenedioxymethamphetamine (MDMA), and cannabis. Australia, as a shipping country, accounts for half of the methamphetamine offered and purchased on *Silk Road 2*. Moreover, it was observed that the online price fixed by Australian sellers for the considered illicit drugs is higher than for any other shipping countries, which is in line with previous studies.

Understanding the virtual and physical drug market necessitates the integration and fusion of different perspectives to capture the dynamic nature of drug trafficking, monitor its evolution and finally improve our understanding of the phenomenon so policy makers can make informed decisions.

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1. Introduction

Technology and globalisation provide new ways to access customers and suppliers while enhancing the security of off-line criminal activity [1]. Traditionally, the vast majority of the global illicit drug trade is conducted through interpersonal networks of drug manufacturers, wholesalers, traffickers and local distributors [2]. Since the launch of the first cryptomarket, *Silk Road*, in 2011, cryptomarkets have transformed the traditional drug sale by

facilitating the creation of global networks of offenders (including both vendors and buyers) [3]. Cryptomarkets are “a type of website that uses advanced encryption to protect the anonymity of the users” [4]. The design of cryptomarkets is similar to that of eBay or Amazon, with searchable listings of products for sale. In contrast to those popular marketplaces, cryptomarkets are part of the *darknet*, an encrypted part of the Web. Their access necessitates a specific communication protocol such as an onion routing, TOR (*The Onion Router*) being the most popular one, used to hide a computer’s internet protocol (IP) address. These cryptomarkets facilitate the online trafficking of illicit goods through encrypted communications and financial transactions using cryptocurrencies (e.g. Bitcoins) [2,5].

Drugs are the most offered products on cryptomarkets, precisely 57% of all products and services offered concern drugs according to a recent study [6]. Therefore, research has mainly

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focused on criminological aspects of drug trafficking such as the study of cryptomarkets' drug buyers through interviews and surveys [7–9], changes or stability in substances offered over time [6,10], supply (wholesale vs retail) [11], country-differences in substance availability and sales [12,13], purity and adulteration of drugs sold on the *darknet* [14] and the risk taken by vendors on cryptomarkets [3]. Surveys [7–9] showed that the drugs most commonly purchased on cryptomarkets were Ecstasy & 3,4-methylenedioxyamphetamine (MDMA), cannabis, lysergic acid diethylamide (LSD) and new psychoactive substances (NPS) while cryptomarkets analysis show that cannabis listings were the most common across a large range of markets, followed by prescription drugs, Ecstasy & MDMA and stimulants (cocaine and amphetamines). There is a predominance of illicit drugs typically associated with recreational use [6]. Most cryptomarkets transactions are consistent with purchase for personal use or "social supply" [6]; however some countries (e.g. China, the Netherlands, Canada and Belgium) and some drugs (e.g. Ecstasy & MDMA and prescription drugs) were associated with wholesale revenue generation [11]. The types of substances for sale have been observed to be relatively stable over the years [6,10]. Van Buskirk et al. [12] noted the influence of several factors (e.g. geographical isolation, domestic production, population prevalence, legal context) in the number of vendors and types of illicit drugs for sale in the five countries investigated. Similar findings were observed for the United Kingdom, Australia and the United States [13]. Caudevilla et al. [14] analysed substances supposed to be purchased on cryptomarkets. In their results, 91.3% of specimens received contained the substance advertised and the purity of most specimens was relatively high. In regards to the risk taken by vendors to ship internationally, it seems associated with the weights of packages sold, the perceived effectiveness of law enforcement of certain countries and the added money they would make by selling internationally [3]. On a rarer occasion, researchers have focused on cryptomarkets through a forensic perspective [5,15]. Indeed, only a few studies emphasised the importance of analysing these marketplaces in combination to physical or/and chemical data to increase the knowledge on illicit drug trafficking, which is in line with a forensic intelligence perspective [5,15]. For example, Rhumorbarbe et al. analysed specimens ordered on cryptomarkets and observed, through the chemical profile, that the cocaine purchased online was similar to specimens seized on the street [15]. This would suggest that a link exists between online and physical markets. Although Horne et al. [16] did not analyse cryptomarkets per se, they were involved, through the Australian Federal Police (AFP) national forensic rapid laboratory (NFRL), in the analysis of mail items detected at the Australian Custom and Border Protection Service. According to their study, up to 75% of all mail items were purchased online. Through the analysis of the packaging (e.g. concealment; fingermarks; labels and stickers), they managed to identify organised crime groups sending a large amount of packages from Canada to addresses in Australia as well as locate the recipients of the packages.

Kruithof et al. [6] identified 50 live cryptomarkets on the hidden web in 2016. Cryptomarkets usually appear and disappear, often due to takedowns or exit scams. According to Soska and Christin [10] and more recently Van Buskirk et al. [17], the long-term marketplace environment appears to be resilient to law enforcement takedowns or exit scams. Although cryptomarkets contribute only slightly to the global illicit drug trade [6], the potential for growth of online drug supply appears considerable. For instance, this growth was observed with legal online shopping. Indeed, nowadays, it is common for customers to shop online. Furthermore, recent studies [6,10] have shown that the number of vendors on cryptomarkets more than doubled from

2013 to 2016, the number of listings has significantly increased and the average number of transactions per vendor has risen from five to nine transactions per month. Concerning customers, the last Global Drug Survey [18] reveals that 6.7% of the respondents bought drugs on the *darknet* in the last year, an increase of 2.2% compared to the 2015 survey. The proportion of respondents who declared a purchase on the *darknet* during the last year varies from country to country, ranging from 2.4% in New Zealand to 18.3% in the United Kingdom. In Australia, 8.3% of respondents mentioned buying drugs on the *darknet*. This trend can be partly explained by the fact that cryptomarkets represent an advantage in comparison to traditional markets as the vendors and buyers can interact anonymously, services can be easily advertised nationally and internationally (i.e. vendors can reach a greater audience) and there is no local competition between vendors [5,11,13]. In addition, most marketplaces provide a feedback system to enforce some kind of quality control [10]. Buyers are highly encouraged to leave feedback when making a purchase which is posted underneath a listing and can be used as a proxy to estimate transactions [10]. Buyers can choose among a large pool of vendors offering a wide range of drugs according to their positive/negative feedback and the shipping country [6]. As a consequence, analysing cryptomarkets is essential as the societal response might be too slow to keep pace with the growth of online drug supply [1].

The success of forensic drug intelligence processes relies on the detection, integration and fusion of different information to capture the dynamic nature of drug trafficking market, monitor its evolution and finally improve our understanding. Indeed, combining the results of concurrent processes based on traces of different nature would provide supplementary added value to draw the most comprehensive market situation [19,20]. Such an approach enables the discussion of the quality and precision of the market analysis since processes explore data through different lenses. Australia was chosen as an illustration of this forensic intelligence approach due to its domestic nature, allowing the comparison of the virtual and physical features of the illicit drug market. Studying a domestic market and showing the connection or differences between the virtual and physical market is of importance to understand the nature of the online trade. This article will be separated in two parts. Using data collected on specific marketplaces (i.e. *Evolution* and *Silk Road 2*), this study will define, in Part I, the characteristics of the online Australian illicit drug market (i.e. nature of trafficking flows (domestic vs. international), types of illicit drug sold and purchased, volume, prices), which will be contextualised in the international trade. In Part II, the data of the Australian virtual market will be compared to the data related to the traditional market such as national seizures and arrests, prevalence data as well as outcomes of specific surveys targeting users' behaviour online (e.g. types of drugs purchased). Using results obtained in Part I, Part II will address the relationship between the online and offline markets. This forensic intelligence approach takes advantage of the diversity of perspectives to provide an estimation of illicit drug distribution and use with the least uncertainty.

2. Method

2.1. Data collection

This research relies on the publicly available HTML source code pages collected by Gwern Brawn, an independent researcher (see <http://gwern.net>) [21], throughout the period *Silk Road 2* and *Evolution* were active, from December 2013 to November 2014 and

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