

This is the peer reviewed version of the following article:

Barratt, M. J., & Aldridge, J. (2016). Everything you always wanted to know about drug cryptomarkets* (*but were afraid to ask). *International Journal of Drug Policy*, 35, 1-6.

which has been published in final form at
<https://doi.org/10.1016/j.drugpo.2016.07.005>

This article may be used for non-commercial purposes in accordance with
[Elsevier's Article Sharing policy](#) and [Hosting policy](#)

© 2016. This manuscript version is made available under the CC-BY-NC-ND 4.0 license <http://creativecommons.org/licenses/by-nc-nd/4.0/>

Barratt, M. J., & Aldridge, J. (Accepted 12/7/2016). Everything you always wanted to know about drug cryptomarkets* (*but were afraid to ask) [Editorial]. *International Journal of Drug Policy*

Everything you always wanted to know about drug cryptomarkets* (*but were afraid to ask)

Monica J. Barratt ^{a, b, c}, Judith Aldridge ^d

^a Drug Policy Modelling Program, National Drug and Alcohol Research Centre, UNSW Australia, Sydney NSW 2052, Australia.

^b National Drug Research Institute, Faculty of Health Sciences, Curtin University, GPO Box U1987, Perth WA 6845, Australia.

^c Centre of Population Health, Burnet Institute, 85 Commercial Road, Melbourne Victoria 3004, Australia.

^d School of Law, University of Manchester, Manchester, M13 9PL, UK.

Article type: Editorial

Word count: 4711

Introduction

For some drug policy scholars, including us, the online marketplace *Silk Road* and its successors are inherently fascinating. When we first discovered *Silk Road* in 2011, on opposite sides of the globe, we could not believe it was real: people were buying illegal drugs anonymously through a global marketplace that resembled eBay or Amazon. We were instantly hooked. Rather than addressing our fellow cryptomarket-obsessed colleagues who will no doubt already be devouring the 12 articles in the issue, we would like to address the remaining readership of IJDP, who may not know much at all about cryptomarkets and may wonder what relevance cryptomarkets have to broader drug policy scholarship.

We believe that there are at least five reasons that the broader drug policy scholarly community should pay attention to drug cryptomarkets. First, cryptomarkets provide us with arguably the first opportunity to analyse the supply side of a drug market in its totality: not using small and often partial samples, but as a near complete population. Second, cryptomarkets are not isolated from broader drug markets: drugs flow into and out of cryptomarkets into broader social and commercial drug supply chains. Third, cryptomarkets provide a new way of monitoring emerging drug trends. Fourth, cryptomarkets offer an illustration of criminal innovation in drug supply as a response to law enforcement efforts. Fifth, cryptomarkets have become a location in which the needs and preferences of drug users are at least partially met: a wide repertoire of available drugs, information and advice, all within a community-based regulatory system that has more or less effectively bypassed state regulation. These marketplaces may therefore provide us with lessons we can usefully apply in a possible post-prohibition world.

In this editorial, we aim to demonstrate why IJDP readers should care about cryptomarkets. What are cryptomarkets and how do they work? How do the papers in this special issue contribute to mapping the innovation of cryptomarkets? What are the novel methodological opportunities and ethical issues that arise in conducting these kinds of studies? And what can we say about the future of cryptomarkets?

Definitions and terms

In 2011, the first cryptomarket *Silk Road* was created by the audacious Dread Pirate Roberts. Its innovation was that it combined technologies used to hide internet user activities (i.e. Tor) and technologies that allowed individuals to make purchases with a digital, non-identity-carrying form of cash (i.e. Bitcoin). The marketplace flourished until seized by the FBI on 2 October 2013. A little over a year later cryptomarkets were again hit by law enforcement agencies in Europe and the United States, in an operation code-named ‘Onymous’. This time a number of cryptomarkets were shut down after undercover law enforcement agents infiltrated marketplace communities. Although law enforcement activities such as these do not seem to have prevented cryptomarket drug trading (Soska & Christin, 2015), the threat of similar actions has arguably had an impact on trust within these communities (van Slobbe, 2016).

While in hacker forums the term ‘cryptomarket’—a term further developed by Martin (2014)—was used to describe these anonymous online marketplaces, *darknet markets* or *DNMs* is the ‘indigenous’ term mostly used at present to describe these phenomena. A variety of terms have been used in the papers in this issue: most use the term ‘cryptomarket’, while others use ‘darknet market’, ‘darknet marketplace’, or ‘dark net marketplace’. We define a cryptomarket as a marketplace that hosts multiple sellers or ‘vendors’, provides participants with anonymity via its location on the hidden web and use of cryptocurrencies for payment, and aggregates and displays customer feedback ratings and comments. Participation in cryptomarkets requires a certain level of technical competence. If you wish to buy drugs, you require: a computer or equivalent device, a special anonymising browser, the marketplace URL, some cryptocurrency, a vendor willing to send the drugs to your location, and an address where the package containing the drugs can be sent. While for a novice with limited experience this process may initially seem daunting, the expanding body of research on cryptomarkets demonstrates that for many, cryptomarket drug trading is effective and is preferred to in-person trading.

Another feature of a cryptomarket is that it acts as a third party for the vendor and buyer: it facilitates trust through an escrow service and dispute arbitration. Most cryptomarkets offer an escrow service where funds are kept until a transaction is ‘finalised’ by the buyer and released to the vendor. However, this centralised escrow model has been exploited by unscrupulous market operators in what has become known as an ‘exit scam’, where market administrators close the entire marketplace and abscond with the funds, in some cases totalling millions of dollars. This development has led some cryptomarkets to offer multi-signature escrow, which prevents exit scams by requiring at least two of three parties (i.e., two of the buyer, vendor and the administrator) to finalise the transaction before the funds can be released. A stronger solution to the exit scam problem is the use of decentralised peer-to-peer exchanges that are not hosted on the hidden web (e.g., OpenBazaar, at least at the time of writing). These markets remove the marketplace as an actor entirely. It is an open question whether these decentralised, peer-to-peer exchanges should be classified as cryptomarkets, as they are still in their infancy and have yet to be fully characterised and studied. As these marketplaces continue to change and evolve, our definition may also need to adapt to accommodate them.

We prefer the term cryptomarket to terms containing the word ‘dark’. Firstly, ‘darknet’ markets, as currently defined indigenously (Wikipedia, 2016), include markets on the hidden web that do not fit our definition of a cryptomarket; for example so-called ‘single vendor’ markets. Secondly, we wish to avoid the connotations associated with ‘dark’ in our writings. While ‘dark’ in this context specifically refers to the technically hidden nature of these phenomena, connotations of ‘dark’ are in the eye of the beholder: dark as evil, illicit, nefarious, prohibited, frightening. Hereon we use the terms ‘cryptomarket’ and ‘hidden web’, rather than ‘darknet market’ and the ‘darknet’.

To understand cryptomarkets, it is important to conceptualise and situate these digital phenomena. If we consider ‘the web’, that is, all of the content accessible through browsers connected to the internet, we can divide it into two: the surface web and the deep web. All

content that can be accessed through search engines is the surface web. The remaining web content is the deep web, defined as content inaccessible via search engines like Google (Bergman, 2001). It has been estimated that the deep web is many magnitudes larger than the surface web (96% of all networked web pages according to Epstein, 2014). The deep web includes content that is locked behind paywalled websites, content accessible through company or academic databases, any kind of database that cannot be searched directly by Google, websites that are not linked to other websites, private websites and forums, and large amounts of social networking site content (e.g. non-public Facebook content). A small part of the deep web content includes hidden internet services, which are websites that can only be accessed through anonymising software (usually Tor, but also through alternatives like I2P). This part of the internet is called the darknet or the hidden web. We consider cryptomarkets to be a subset of the hidden web, which itself is a subset of the deep web, which itself is a subset of the entire web.

Mapping the innovations of cryptomarkets

How do cryptomarkets affect the types of drugs available for purchase and use? In this special issue, Aldridge and Décary-Héту (2016b) use the number of customer feedback comments and/or ratings on drug listings as a proxy indicator for the number of transactions. This methodology enables them to provide estimated monthly revenue by drug type, finding that at least in the last month of operation of Silk Road 1, the highest revenue was from cannabis sales, followed by ecstasy/MDMA, stimulants, pharmaceuticals, psychedelics and opioids. Using a more recent analysis of the market Agora, Van Buskirk et al. (2016a) measured total numbers of listings, finding that the top three categories were, in order: cannabis, pharmaceuticals, and ecstasy/MDMA. In Aldridge and Décary-Héту (2016b), pharmaceuticals boasted the largest number of listings overall, but when the value of the estimated transactions from each listing was considered, this category fell below other major illicit drug categories. The story of the most popular drugs on cryptomarkets appears to be remarkably consistent from market to market, across time, and across different study types. This consistency suggests that cryptomarkets appear so far to serve a particular set of drug market sectors (e.g. recreational and ‘party’ drugs) more than others (e.g. drugs more often associated with dependent or problematic use). This finding of consistency across results of different studies using these similar market-scraping methodologies also gives us confidence in the reliability of the method. Researchers interested in drug markets therefore should take notice of this valuable new approach slowly accumulating evidence of reliability and validity of its measures. Indeed, papers in this issue utilising qualitative interviewing and forum analysis (Bancroft & Reid, 2016; Barratt, Maddox, Lenton, & Allen, 2016b) and larger scale survey methods (Barratt, Ferris, & Winstock, 2016a; van Buskirk et al., 2016b) also reproduce the finding that these markets primarily cater for users of well-known illegal drugs (especially cannabis, ecstasy and LSD) and pharmaceuticals, with novel substances and ‘harder’ drugs present, but less popular.

This special issue makes a distinct contribution to our understanding of the quality, purity and adulteration of drugs sold through cryptomarkets. Studies based on surveys of drug users reiterate previous research in finding that perceptions of higher drug quality on cryptomarkets

is a major—and perhaps the most important—reason for preferring cryptomarket drug sourcing over in-person transactions (Barratt, et al., 2016a; van Buskirk, et al., 2016b). In the first peer reviewed article of its kind, Caudevilla et al. (2016) report results of laboratory testing of samples sent in response to an advertisement on the hidden web by their lab at Energy Control, Spain. Their cocaine samples were higher in purity and less likely to be adulterated than cocaine samples described in other data sources (e.g. European police seizures and Spanish drug checking results). While these laboratory results support and go some way towards confirming the beliefs of cryptomarket users about better quality drugs being available on cryptomarkets, Bancroft and Reid (2016), in their qualitative analysis of interviews and forum content, remind us that drug quality can be better understood as “the characteristics that make the drug effective for the user”, not just a pharmacological quality of the drug. While their interview and forum data confirm user expectations around drug quality on cryptomarkets, they also found that quality is not equated only with high drug purity. For example, some drug combinations are prized rather than considered ‘adulterated’.

Four papers in this issue either surveyed or interviewed people who reported engagement with or purchase of drugs from cryptomarkets (Bancroft & Reid, 2016; Barratt, et al., 2016a; Barratt, et al., 2016b; van Buskirk, et al., 2016b). In all papers, the demographic profile of participants was described as mainly male (at least 80%) and aged early- to mid-20s. While most of the drug use described in Barratt et al. (2016b) could be characterised as occasional or recreational in nature, some dependent and potentially problematic use was also described. Bancroft and Reid (2016) observed through their interviews and forum content analysis that the drug cryptomarket arena was not only supporting recreational use patterns, but interestingly, the ‘rational consumer’ discourse most often associated with recreational use was also being utilised by dependent users within the cryptomarket setting. Whether seeking a new psychedelic compound or the next batch of heroin, cryptomarket forums were being used to share information about drug quality and vendor reliability – a phenomenon that Bancroft and Reid describe as ‘indigenous harm reduction’. This is an important finding: that users of drugs like heroin and methamphetamine evidence this kind of rational discourse undermines popular and policy understandings of these users as irrational by definition.

When considering the impact of drug cryptomarkets on drug prevalence in the broader population, we need to get a better sense of the extent to which cryptomarkets might be expanding the number of people who use drugs overall. Barratt et al. (2016b) address this question by providing some case studies of individuals who report either having never accessed illegal drugs prior to using cryptomarkets or accessing illegal drugs through cryptomarkets after many years of abstaining. While it is likely that this group forms a minority of cryptomarket users, understanding in what circumstances these people will initiate or reinstate drug use through cryptomarkets is a worthwhile topic of future research. Barratt et al. also remind us that adding new drug types to one’s drug use repertoire or moving from abstaining to drug using is not necessarily a move that will result in greater overall harm. Some drug use results in benefits: including, for example, personal insights, self-medication, or valuable social or otherwise pleasurable experiences.

How do cryptomarkets reconfigure marketplace transactions? A theme within this special issue is the acknowledgement that cryptomarkets do not solely cater for the end user of a drug. Aldridge and Décary-Hétu (2016b) illustrate that cryptomarkets not only provide drug sellers with a new virtual location for selling drugs, they also provide sellers with a virtual location for sourcing drugs to be resold online or offline, or shared among friendship networks. Aldridge and Décary-Hétu (2016b) found that one quarter of the estimated cryptomarket revenue was derived from wholesale transactions, while Barratt et al. (2016a) found that one quarter of people who reported obtaining drugs through cryptomarkets supplied to others. These are likely to be lower bound estimates. The implications of these findings are that the cryptomarkets play a brokerage role not just at the retail level by bringing together drug sellers and their drug using customers, but also at the wholesale market level, allowing those intent on redistribution to source stock.

Since the advent of journalistic and academic writing and research on drug cryptomarkets (Aldridge & Décary-Hétu, 2014; Martin, 2014; Ormsby, 2014), a question on everyone's lips has been whether cryptomarkets may reduce drug market violence. Answering this question is not easy, but with Barratt et al. (2016a) we have the first large-scale survey-based evidence that cryptomarket customers report fewer incidents of violence and threats of violence when purchasing from cryptomarkets in comparison with their preferred alternative source of drugs, usually friends or known dealers. Aldridge and Décary-Hétu (2016b) caution that conflict may manifest in other forms, including damage to reputation via 'doxxing' (gaining access to personal information and threatening exposure), other forms of blackmail, theft, fraud and cyber-bullying. Tzanetakis et al. (2016) argue that cryptomarket features (e.g. escrow, customer feedback) function to facilitate trust in the risky context of the illegal drug trade. These mechanisms can fail though, and market participants may face the following transactional conflicts: vendors scamming buyers (e.g., 'Sorry, the shipment got lost!'), buyers scamming vendors (e.g., 'I didn't receive the drugs!'), and marketplace administrator exit scams, as described earlier. While the removal of physical violence as a threat within drug markets may render cryptomarkets safer than other market types, digital or online forms of violence may still proliferate in these new settings.

One of the unique possibilities enabled by cryptomarkets is global trade in illicit drugs without the need to employ long supply chains. The potential for globalisation of the drug trade that cryptomarkets may facilitate is demonstrated in three papers in this issue. Aldridge and Décary-Hétu (2016b) describe cryptomarkets as facilitating drug diffusion across borders. Using data from the original Silk Road, they estimated that the proportion of vendor-earned revenue associated with wholesale level transactions was 24% for USA, 20% for the Netherlands (NL), and 16% for Canada. Interestingly 12% of China's estimated revenue was from wholesale transactions but 46% of China's listings were considered wholesale: this was the largest proportion of listings of any country. Using newer data from the cryptomarket Agora, Van Buskirk et al. (2016a) found that the top five countries by number of listings were USA, UK, Australia, China and the NL. Van Buskirk et al. identified listings per vendor as an indicator of wholesale activity, finding that the NL and China had the highest number of listings per vendor. In Décary-Hétu et al. (2016), the majority of cryptomarket vendors

were willing to take the ‘risk’ of shipping internationally. Willingness to ship internationally was associated with smaller weight of packages, less than perfect vendor feedback ratings, and lower perceived effectiveness of law enforcement in the country from which vendors shipped. Vendors in countries with wealthier populations and higher drug expenditure were less willing to ship internationally. While cryptomarkets can enable a globalisation and flattening of drug trading, this work shows how international trading is not an inevitable outcome of cryptomarket use.

Another point highlighted in our special issue is that cryptomarkets are not only places to trade drugs and other commodities or services. Silk Road was described by its creator as a technology of liberation from the dictates of the state (see Maddox, Barratt, Allen, & Lenton, 2016). Munksgaard and Demant’s paper (2016) tracked libertarian discourse across online forum content, finding a sharp decline in libertarian discussion following the closure of Silk Road 1, as new cryptomarkets, perhaps built with different primary motives, took its place. Despite the decline in libertarian discourse in these communities, cryptomarkets may still be understood as forms of political activism and resistance of dominant paradigms. For those people with the technical skills and resources to do so, it is possible to construct “informal governing nodes” (Martin, 2014) or “digital demimondes” (Maddox, et al., 2016) that, for the most part, remain outside of state control.

Methodological innovations

Perhaps the most exciting methodological development for studying drug markets is showcased by the papers in the issue that collect so-called ‘digital traces’ (see Décary-Héту & Aldridge, 2015) of actual drug selling activities. Three papers (Aldridge & Décary-Héту, 2016b; Décary-Héту, et al., 2016; Van Buskirk, et al., 2016a) using this approach generate large datasets that provide us with unprecedented insight into drug selling activities because the data collected from these sites can comprise full population ‘traces’ of these activities. This methodology represents a step-change for researchers who have mostly relied on administrative data (Broséus, Huhtala, & Esseiva, 2015; Odoardi, Romolo, & Strano-Rossi, 2016), self-report with small samples of drug dealers (e.g., Caulkins, Johnson, Taylor, & Taylor, 1999; Chatwin & Potter, 2014); or samples of incarcerated—and therefore at least to an extent unsuccessful—drug supply offenders (Sevigny & Caulkins, 2004). The advantage of ‘webometric’ approaches like these is the ability of researchers to generate knowledge based upon populations—of drug sellers, of drugs sold, of drug prices, of drug quantities—rather than on the basis of variously unrepresentative samples selected from those populations (Aldridge & Décary-Héту, 2014). Insights generated by papers in this issue are found in connection to the wide variation in substances sold on cryptomarkets and the extent to which high priced transactions suggest ‘wholesale’ market activity (Aldridge & Décary-Héту, 2016b); factors that may encourage cryptomarket vendors to take on risks (to profits, of arrest) associated with shipping across international borders (Décary-Héту, et al., 2016); and the variation in drugs sold by vendors located in countries across the globe (Van Buskirk, et al., 2016a).

Other articles in the issue also employ relatively new forms of data that social researchers are increasingly utilising: online discussion forums. Their authors draw from the highly active cryptomarket discussion forums on which vendors, their customers, and marketplace administrators converge for mutual support and advice. These forums facilitate the discussion of the effective use of cryptomarkets as locations for buying and selling drugs, and host knowledge about reducing the potential harms and increasing the benefits of drug use. Bancroft and Reid (2016) combine discussion forum data with interviews to understand the complex ways in which drug users understand drug quality. Décary-Héту et al. (2016) use discussion among buyers and sellers about the risks of shipping drugs abroad to help contextualise the findings of their multivariate analysis. Tzanetakis et al. (2016) examine how trust is facilitated on cryptomarkets, and to this end, the authors capture data from the profile pages of four vendors and their forum chats, alongside feedback from their customers. Munksgaard and Demant (2016) utilise time-series discussion forum analysis to assess the changing political content on cryptomarkets, through which they observe a decline in libertarian discourse.

In contrast to digital trace analyses of markets or the use of online forum content as data, Barratt et al. (2016b) took an active participatory approach to researching drug buyers through cryptomarkets. These researchers interacted within cryptomarket community groups on their forums and chat channels, and through Reddit and Twitter, resulting in 17 interviews conducted through encrypted online chat. Maintaining an active presence within communities involves identifying oneself as a researcher in what can be a hostile environment. In a methodological reflection published elsewhere, Barratt and Maddox (2016) argue that their participatory (or active ethnographic) approach yields additional unique insights beyond what can be gleaned from unobtrusive analyses. In one example, engaging with the community made apparent the tensions between community members' desires for both publicity and privacy (see Barratt and Maddox). As valuable as active ethnographic insights may be, we now question how possible it is to conduct the same kind of study with cryptomarket communities post-Onymous, as they have increasingly fragmented and become even more wary of outsiders. Nevertheless, the field is dynamic, and such active engagement may still prove possible and productive in future.

Challenges of cryptomarket research

The application of these cutting-edge approaches to the study of the hidden web brings ethical conundrums that, as Martin and Christin (2016) argue, have outpaced scholarly contributions to the literature that contends with them. Researchers using cryptomarket-sourced data still face the conventional ethical challenges that many criminologists and drug researchers do already: protecting those about whom we often hold incriminating information. But fresh ethical challenges are also raised. Evolving research consensus about what constitutes private versus public space on the internet—and where, therefore, consent must be obtained or can be assumed—may not map neatly onto the hidden web. Does the very fact of cryptomarket participants locating themselves on the hidden web, requiring those wishing access to create accounts, suggest a designation of their location as private and therefore requiring their consent for researchers to study them? With the proliferation of

research conducted using cryptomarket-scraped data (e.g., Christin, 2013; Dolliver, 2015; Dolliver & Kenney, 2016; Soska & Christin, 2015), it seems that many researchers think not. And yet concern not to alarm marketplace participants with this kind of research activity and to prevent research being used to prosecute individuals, for example, through inadvertent identification of marketplace participants by law enforcement, is clearly an issue that exercises researchers (see Décary-Héту & Aldridge, 2015; Martin & Christin, 2016; Soska & Christin, 2015).

The contributors to this special issue employ differing strategies to deal with these thorny problems. In the post-Silk Road 1 era, some researchers might elect to keep anonymous the marketplace itself from which data have been collected. Bancroft and Reid (2016) describe the marketplace from which forum data were collected using the fictional name ‘Merkat’. Van Buskirk et al. (2016a) and Tzanetakis et al. (2016), in contrast, are explicit about the marketplace from which data were drawn. Although not discussed by the authors, a potential advantage of this transparent approach is that other researchers may then draw comparisons in later research, or even to replicate findings.

The replication issue is addressed head-on in this issue. Munksgaard et al. (2016) attempt - and fail - to replicate the findings of an article published in this journal (Dolliver, 2015) that had subsequently been criticised in connection to producing results based on what some judged to be incomplete crawls (Aldridge & Décary-Héту, 2015; Van Buskirk, Roxburgh, Naicker, & Burns, 2015). Martin and Christin (2016) call for researchers to make their data public, thereby allowing others the opportunity to reproduce their findings, but acknowledge the unlikely but nevertheless theoretically possible potential risks of doing so: the increased risks that individual marketplace participants might be identifiable in spite of mostly effective strategies they use to hide their identities. Bancroft and Reid (2016) and Décary-Héту et al. (2016) attempt to reduce the possibility that discussion forum data can be searched to connect published results even just to anonymised profile names by publishing only paraphrased quotations, while Tzanetakis et al. (2016) used screenshots related to the vendors they profiled, with screennames redacted. Thus, while sharing data may be useful in allowing other researchers to reproduce results, Stroebe and Strack (2014) caution against exact replications as the solution to the so-called ‘replication crisis’; or as Leek and Peng (2015, p. 1645) point out, “reproducible research can still be wrong”.

Cryptomarket futures

The *International Journal of Drug Policy* has been at the forefront of publishing new research on drug cryptomarkets, including the first qualitative studies of the use of Silk Road (van Hout & Bingham, 2013a, 2013b, 2014), the first study of Silk Road 2 using marketplace crawling and scraping of the ‘digital traces’ left by vendors and customers (Dolliver, 2015), and two editor-invited responses to controversy connected to that work (Aldridge & Décary-Héту, 2015; Van Buskirk, et al., 2015). This publication of these 12 new articles together as a special issue—the first devoted to the topic in the world—is testament to the significance of this drug market innovation.

We have argued in this editorial that cryptomarkets provide drug policy scholars with a unique opportunity to study a drug market in its totality and to monitor new trends in drug availability and use. We have also noted that cryptomarkets face challenges in the form of law enforcement crackdowns, but also from scams by cryptomarket vendors, customers and marketplace administrators. So what do we think the future holds for drug cryptomarkets?

We do not yet have good evidence to indicate what proportion of the population may be sourcing drugs from cryptomarkets, and whether their numbers may be increasing. However, the last four administrations of the large scale Global Drug Survey (Cox, 2016) suggest the trajectory may be upward. There may, however, be limits to the potential growth of cryptomarkets. First, the technologies on which these marketplaces rely may fail, and although compromises to Tor have been rare, vulnerabilities have been exposed. Second, law enforcement and internal scams may combine to sabotage the essential element of trust required for the trade in illegal goods, thereby compromising the functioning of marketplace regulatory mechanisms. A third challenge to the continued success of drug cryptomarkets is in the willingness and ability of drug-buying customers to access them. Drug-buyers may perceive greater risks attached to online buying, or may otherwise prefer existing offline arrangements (Aldridge & Décary-Hétu, 2016a). While it may not be possible to predict the precise configuration in which internet innovations assemble to facilitate drug sales, our view is that innovation in this sphere will prevail: just as licit marketplaces have always and will continue to innovate and evolve, so too will illegal marketplaces. If the barriers for entry are dramatically reduced in future due to technological developments, for example making the purchasing of cryptocurrencies easier and their use even more difficult to trace, we may find dramatic uptake in the use of cryptomarkets by drug sellers and their drug-buying customers.

There are many urgent research questions we need to ask in this connection. What are the factors that encourage or discourage uptake in the use of cryptomarkets by drug using buyers and sellers? How have cryptomarkets innovated in response to law enforcement and other challenges? How effective are their self-regulatory mechanisms? However unlikely it is that cryptomarkets—in their current form or some variant—disappear, even should this be the case, their study remains critically important to drug scholars. With the advent of drug cryptomarkets we have seen a profound and successful protest and challenge against prohibition: against states deciding what their citizens can and cannot imbibe to alter states of consciousness, to enhance performance and pleasure, or even to feed ‘addictions’ (see Walsh, 2016). We have many lessons yet to learn from drug cryptomarkets past, present and future.

Acknowledgements

MB is the recipient of an NHMRC Early Career Researcher Fellowship (APP1070140). The National Drug and Alcohol Research Centre at UNSW Australia and the National Drug Research Institute in the Faculty of Health Sciences at Curtin University are supported by funding from the Australian Government under the Substance Misuse Prevention and Service Improvement Grants Fund. MB is a Visiting Fellow at the Burnet Institute and gratefully acknowledges the contribution to this work of the Victorian Operational Infrastructure Support Program received by the Burnet Institute. JA acknowledges the support of UNSW Australia where she was a Visiting Fellow during the writing of this editorial. We wish to thank Alexia Maddox for supporting this piece through provision of a writers' retreat, and Stu Hatton, for his astute editorial advice. Any surviving errors are our own.

References

- Aldridge, J., & Décary-Hétu, D. (2014). Not an 'Ebay for Drugs': The cryptomarket 'Silk Road' as a paradigm shifting criminal innovation. *Social Science Research Network (SSRN)*, <http://ssrn.com/abstract=2436643>
- Aldridge, J., & Décary-Hétu, D. (2015). A response to Dolliver's "Evaluating drug trafficking on the Tor Network: Silk Road 2, the sequel". *International Journal of Drug Policy*, 26, 1124–1125.
- Aldridge, J., & Décary-Hétu, D. (2016a). Cryptomarkets and the future of illicit drug markets. In European Monitoring Centre for Drugs and Drug Addiction (Ed.), *The internet and drug markets* (EMCDDA Insights 21) (pp. 23–30). Luxembourg: Publications Office of the European Union.
- Aldridge, J., & Décary-Hétu, D. (2016b). Hidden wholesale: Characterizing the supply side of drug cryptomarkets. *International Journal of Drug Policy, This Volume*
- Bancroft, A., & Reid, P. S. (2016). Concepts of illicit drug quality among darknet market users: Purity, embodied experience, craft and chemical knowledge. *International Journal of Drug Policy, This Volume*
- Barratt, M. J., Ferris, J. A., & Winstock, A. R. (2016a). Safer scoring? Cryptomarkets, social supply and drug market violence. *International Journal of Drug Policy, This Volume*
- Barratt, M. J., & Maddox, A. (2016). Active engagement with stigmatised communities through digital ethnography. *Qualitative Research*. Epub ahead of print 22 May 2016. doi: 10.1177/1468794116648766
- Barratt, M. J., Maddox, A., Lenton, S., & Allen, M. (2016b). 'What if you live on top of a bakery and you like cakes?' – Exploring the drug use and harm trajectories before, during and after the emergence of Silk Road. *International Journal of Drug Policy, This Volume*
- Bergman, M. K. (2001). The deep web: Surfacing hidden value. *Taking License*, 7(1). doi: 10.3998/3336451.0007.104.
<http://quod.lib.umich.edu/j/jep/3336451.0007.104?view=text;rgn=main>
- Broséus, J., Huhtala, S., & Esseiva, P. (2015). First systematic chemical profiling of cocaine police seizures in Finland in the framework of an intelligence-led approach. *Forensic Science International*, 251, 87–94.
- Caudevilla, F., Ventura, M., Fornís, I., Barratt, M. J., Ildanosa, C. G., Quintana, P., Vidal, C., Muñoz, A., & Calzada, N. (2016). Results of an international drug testing service for cryptomarket users. *International Journal of Drug Policy, This Volume*
- Caulkins, J. P., Johnson, B., Taylor, A., & Taylor, L. (1999). What drug dealers tell us about their costs of doing business. *Journal of Drug Issues*, 29, 323–340.
- Chatwin, C., & Potter, G. (2014). Blurred boundaries: The artificial distinction between "use" and "supply" in the U.K. cannabis market. *Contemporary Drug Problems*, 41, 536–550.
- Christin, N. (2013, May 13–17). *Traveling the Silk Road: A measurement analysis of a large anonymous online marketplace*. Paper presented at the International World Wide Web Conference (IW3C2), Rio de Janeiro, Brazil.

- Cox, J. (2016, June 14). More people than ever say they get their drugs on the dark web. *Motherboard, Vice*. Retrieved from <http://motherboard.vice.com/read/more-people-than-ever-say-they-get-their-drugs-on-the-dark-web> and archived at <http://www.webcitation.org/6iGuXDpbd>
- Décary-Hétu, D., & Aldridge, J. (2015). Sifting through the net: Monitoring of online offenders by researchers. *European Review of Organised Crime*, 2, 122–141.
- Décary-Hétu, D., Paquet-Clouston, M., & Aldridge, J. (2016). Going international? Risk taking by cryptomarket drug vendors. *International Journal of Drug Policy, This Volume*
- Dolliver, D. S. (2015). Evaluating drug trafficking on the Tor network: Silk Road 2, the sequel. *International Journal of Drug Policy*, 26, 1113–1123.
- Dolliver, D. S., & Kenney, J. L. (2016). Characteristics of drug vendors on the Tor network: A cryptomarket comparison. *Victims & Offenders*. Epub ahead of print 2 May 2016. doi: 10.1080/15564886.2016.1173158.
- Epstein, Z. (2014, January 20). How to find the Invisible Internet. *BGR*. Retrieved from <http://bgr.com/2014/01/20/how-to-access-tor-silk-road-deep-web/> and archived at <http://www.webcitation.org/6iOZ4jayj>
- Leek, J. T., & Peng, R. D. (2015). Reproducible research can still be wrong: Adopting a prevention approach. *Proceedings of the National Academy of Sciences*, 112, 1645–1646.
- Maddox, A., Barratt, M. J., Allen, M., & Lenton, S. (2016). Constructive activism in the dark web: cryptomarkets and illicit drugs in the digital ‘demimonde’. *Information, Communication and Society*, 19, 111–126.
- Martin, J. (2014). *Drugs on the dark net: How cryptomarkets are transforming the global trade in illicit drugs*. New York: Palgrave Pivot.
- Martin, J., & Christin, N. (2016). Ethics in dark net research. *International Journal of Drug Policy, This Volume*
- Munksgaard, R., & Demant, J. (2016). Mixing politics and crime: The prevalence and decline of political discourse on the cryptomarket. *International Journal of Drug Policy, This Volume*
- Munksgaard, R., Demant, J., & Branwen, G. (2016). A replication and methodological critique of the study “Evaluating drug trafficking on the Tor Network”. *International Journal of Drug Policy, This Volume*
- Odoardi, S., Romolo, F. S., & Strano-Rossi, S. (2016). A snapshot on NPS in Italy: Distribution of drugs in seized materials analysed in an Italian forensic laboratory in the period 2013–2015. *Forensic Science International*, 265, 116–120.
- Ormsby, E. (2014). *Silk Road*. New York: Pan Macmillan.
- Sevigny, E. L., & Caulkins, J. P. (2004). Kingpins or mules: An analysis of drug offenders incarcerated in federal and state prisons. *Criminology & Public Policy*, 3, 401–434.
- Soska, K., & Christin, N. (2015, August 12–14). *Measuring the longitudinal evolution of the online anonymous marketplace ecosystem*. Paper presented at the 24th USENIX Security Symposium, Washington, D.C.
- Stroebe, W., & Strack, F. (2014). The alleged crisis and the illusion of exact replication. *Perspectives on Psychological Science*, 9, 59–71.

- Tzanetakis, M., Kamphausen, G., Wersé, B., & von Laufenberg, R. (2016). The transparency paradox. Building trust, resolving disputes and optimising logistics on conventional and online drugs markets. *International Journal of Drug Policy, This Volume*
- van Buskirk, J., Naicker, S., Roxburgh, A., Bruno, R., & Burns, L. (2016a). Who sells what? Country specific differences in substance availability on the Agora dark net marketplace. *International Journal of Drug Policy, This Volume*
- van Buskirk, J., Roxburgh, A., Bruno, R., Naicker, S., Lenton, S., Sutherland, R., Whittaker, E., Sindicich, N., Matthews, A., Butler, K., & Burns, L. (2016b). Characterising dark net marketplace purchasers in a sample of regular psychostimulant users. *International Journal of Drug Policy, This Volume*
- van Buskirk, J., Roxburgh, A., Naicker, S., & Burns, L. (2015). A response to Dolliver's "Evaluating drug trafficking on the Tor network". *International Journal of Drug Policy, 26*, 1126–1127.
- van Hout, M. C., & Bingham, T. (2013a). 'Silk Road', the virtual drug marketplace: A single case study of user experiences. *International Journal of Drug Policy, 24*, 385–391.
- van Hout, M. C., & Bingham, T. (2013b). 'Surfing the Silk Road': A study of users' experiences. *International Journal of Drug Policy, 24*, 524–529.
- van Hout, M. C., & Bingham, T. (2014). Responsible vendors, intelligent consumers: Silk Road, the online revolution in drug trading. *International Journal of Drug Policy, 25*, 183–189.
- van Slobbe, J. (2016). The drug trade on the deep web: A law enforcement perspective. In European Monitoring Centre for Drugs and Drug Addiction (Ed.), *The internet and drug markets* (EMCDDA Insights 21) (pp. 77–83). Luxembourg: Publications Office of the European Union.
- Walsh, C. (2016). Psychedelics and cognitive liberty: Reimagining drug policy through the prism of human rights. *International Journal of Drug Policy, 29*, 80–87.
- Wikipedia. (2016). Darknet markets. Retrieved from https://en.wikipedia.org/wiki/Darknet_market and archived at <http://www.webcitation.org/6iOYLtviY>