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Abstract

‘I know this whole market is based on the trust you put in me and I don't take that lightly’: Trust, Community and Discourse in Crypto-drug Markets

This study uses a Corpus Assisted Discourse Studies methodology to provide the first systematic analysis of how trust is discursively constructed in crypto-drug markets. The data come from two purpose-built corpora. One comprises all the forum messages posted on the flag-ship crypto-drug market *Silk Road* during the years in which it traded on the hidden-net (c. 250 million words). The other corpus comprises all the reports published by the United Nations Office on Drugs and Crime (UNODC) during the same period (c. 153 thousand words). Our analysis of trust focuses on the identities of those buying and selling drugs. The findings reveal that the *Silk Road* community members (i) regularly discussed vendors’ identities alongside a continuum of trust-risk calculation, explicitly identifying both ‘good’ and ‘bad’ practice and hence engaging in self-regulatory discourse practices; and (ii) mainly constructed drug users’ identities in relation to values of expertise, integrity and benevolence. The findings also suggest that hard law enforcement activity, such as crypto-drug market closure, may encourage technological innovation within these markets. . Moreover, our results show a disconnect between the discursive reality of the policy-making documents we examined and the very crypto-drug markets that they seek to legislate.

Key words: trust, crypto-drug markets, drug vendor, drug user, discourse, escrow, Silk Road, drug policy-making

‘I know this whole market is based on the trust you put in me and I don't take that lightly’: Trust, Community and Discourse in Crypto-drug Markets

1. Introduction

This article examines trust in crypto-drug market communities, specifically how their members discursively construct who/what is (not) to be trusted therein. Crypto-drug markets are digital markets trading in drugs within the so-called ‘hidden net’.¹ The particular market that our study focuses on is *Silk Road*. Founded in 2011 as a crypto market trading in a wide range of illicit items, *Silk Road 1.0* soon removed weapons from its listing, rebranding itself as a crypto-*drug* market. In October 2013, *Silk Road 1.0* was taken down by the United States’ Federal Bureau of Investigation (FBI) and its founder, Ross Ulbricht, was arrested and subsequently given a double life prison sentence. Then, on 6th November 2013, *Silk Road 2.0* was launched, Blake Benthall becoming its administrator. A year later, on 6th November 2014, the FBI seized *Silk Road 2.0* and Benthall was arrested. That same month *Silk Road 3.0 Reloaded* was launched, allegedly predating Benthall’s arrest by a few hours, and therefore demonstrating both opportunism and the brand’s ability to rise repeatedly despite interdiction measures.

Trust is a key concern in the hidden net; those behind the creation and / or administration of crypto-(drug) markets are known to go to considerable lengths to show that members can trust that transactions therein are ‘safe’, that is, that there is a low risk of being caught by law enforcement without being scammed by other members. Indeed, the quote in the title of this article comes from a post published by Ulbricht after a market outage in November 2012 caused *Silk Road 1.0* community members to fear he had absconded with the funds stored on the site.

A growing literature into identity construction in surface-net contexts (e.g., Mayweg-Paus and Jucks 2017, Hacıyakupogly and Zhang 2015, Thurlow and Mroczek 2011) links cyber-trust development to personal and social identity construction (Boyd 2002, Taylor 2006),

¹ In this article we use the term ‘hidden net’ to refer to internet accessible through anonymising software and encrypted services. We deliberately avoid referring to it as the ‘dark net’ (and to crypto-markets as ‘dark net’ markets) because of the connotations of the term ‘dark’ with evil, nefarious and frightening, amongst other, rather than simply to denote ‘the technically hidden nature of these phenomena’ (Barratt and Aldridge 2016: 2).

with identities in turn being performed in and through discourse (see, e.g. Joseph 2004, De Fina, Schiffrin and Bamberg 2007). Yet there is a comparative scarcity of research into trust-building in the hidden net. Indeed, to our knowledge, ours is the first study to examine the discursive means by which trust is constructed in crypto-drug markets, and as such it contributes to filling an important gap in our understanding of the relationship between trust, identity and discourse in illicit digital environments.

2. Doing Cyber-trust

There is an ever-growing literature into cyber-trust, spanning disciplines ranging from Computer Sciences and Engineering through to Security Studies and Sociology. A detailed review of this body of scholarship is beyond the scope of this article. Nevertheless, three aspects thereof are directly relevant to our study, as we next consider.

2.1 (Cyber-)Trust and Risk - Flip Sides of the Same Coin

Trust is generally conceived of as one's willingness to be vulnerable to another's actions (see e.g. Gambetta 1988; Mayer, Davis and Schoorman 1995; Bhattacharya, Devinney and Pillutla 1998; Castelfranchi and Falcone 2000). Risk-taking is consequently inherent. In Luhmann's (1988:103) words, trust is 'an attitude which allows for risk-taking decisions'. It entails a 'subjective assessment of one party that another party will perform a particular transaction according to his or her confident expectations, in an environment characterized by uncertainty' (Ba and Pavlou 2002:245). Importantly, the transaction need not only involve material goods: emotions, information, experiences are also 'goods' about which risk and trust assessments are regularly made. Importantly, trust-risk relations are 'always only meaningful within a specific transactional context' (Wolf and Muhanna 2011:47), that is to say, there is always a specific object / task with respect to which trust-risk dynamics operate.

A number of studies argue that trusting others in cyberspace is riskier than doing so in non-cyber spaces (see, e.g., Jaswal, Perez-Edgar, Kondrad, et al. 2014; Wolf and Muhanna 2011).² This is because, the argument goes, cyberspaces pose greater challenges to our cognitive

² Whilst reference is made to trust in 'cyber' and 'non-cyber' spaces throughout the article, it is important to note that the two spaces are rather seamlessly integrated in our daily lives.

ability to decide whom to trust (Hendriks, Kienhues and Bromme 2015). Furthermore, some cyberspaces – including those in the hidden net – attract risk takers and trust exploiters. Décary-Héту, Paquet-Cloustone and Aldridge (2016), for instance, found most *Silk Road 1.0* vendors to be high risk-takers. Risk is known to be a driving force for criminal activity (Lane and Cherek 2000; Mungan and Klick 2014), and (crypto) drug dealing in the hidden net operates extra-judicially.

Notwithstanding the above, research has also shown that individuals apply specific types of cognitive heuristics to decide what level of trust to invest in particular cyber contexts (see e.g., Metzger, Flanagin and Medders 2010; Metzger and Flanagin 2013, Sperber et al 2010). Various taxonomies have been developed in order to determine, quantitatively, how individuals assess trust and related concepts, such as credibility, across cyberspaces. Hendriks, Kienhues and Bromme (2015), for instance, identify three such factors in surface net contexts, namely expertise, integrity and benevolence. Expertise refers to ‘knowledge about the topic of interest’; integrity to ‘adherence to the norms and standards of one’s profession’, and benevolence to ‘orientation towards others or society, for example a sense of responsibility and morality’. Ratan, Chung, Shen et al. (2010) argue that the level of self-disclosure, message privacy status and communicative modality are the main factors guiding trust assessment in massively multiplayer online games. And Metzger and Flanagin (2013) propose six types of cognitive heuristics for assessing cyber-credibility: reputation, endorsement, consistency, self-confirmation, expectancy violation and persuasive intent. Importantly, they also stress that these types overlap in ways that are yet to be fully understood.

Trust and risk are, then, flip sides of the same coin, and the dynamics for building and assessing them are complex. Moreover, trust-risk dynamics are often examined in dyadic (truster-trustee) terms: one party, whether an individual or a group, decides whether / how much to render themselves vulnerable to the actions of another party, be it an individual or a group (e.g., Mayer, Davis and Schoorman 1995, Baier 1986). Whereas this is undoubtedly the case in a number of (cyber) spaces, (cyber-) trust operates as a triad in many others. Intermediaries are common trust-enabling actors across transactional contexts. A number of e-commerce platforms build in a third party within their technical systems, justifying this in terms of trust enhancement and/ or risk reduction. Online reputation systems, for instance, allow buyers and sellers to post feedback about their transactional experiences with other

buyers and sellers. These systems are known to be effective in reducing perceived transaction-specific risks (Wolf and Muhanna 2011).

A common intermediary-based service developed to generate trust in cyber-markets is escrow. The term generally refers to money being held by a third party on behalf of the two other parties involved in a cyber-transaction. In other words, buyer and seller trust each other via an escrow, which also handles dispute resolution if required. Use of escrow in centralised surface net markets, such as e-Bay, is believed to try to offset users' underlying lack of trust in these markets (Boyd 2002).

In crypto-drug markets use of escrow seeks both to avoid law enforcement intervention and to increase trust in vendors' and the marketplace's reputations, which in turn serves to increase the market's income. As Tzanetakis et al (2016:61) argue, 'by mobilising trust on the customers' side,' sellers in crypto-drug markets seek to attract new buyers, which 'reduces the buyers' perception of risk of ordering drugs on the darknet from an unknown stranger.' As in other crypto(-drug) markets, vendors and buyers in *Silk Road* must trust that the marketplace itself can effectively mediate their transactions, that it is protected from law enforcement surveillance, and that it will not defraud intentionally vendors and / or users (Horton-Eddison and Di Cristofaro 2017).

Trust in crypto-markets is therefore multi-dimensional – it entails trust between user and vendor, as well as user and vendor confidence that law enforcement can be evaded and that the marketplace (i.e., its escrow service) can host the transaction reliably. The latter is a key concern for these markets' community members. Crypto-drug markets have experienced a number of 'exit scam' activities. For example, various attempts at exploiting *Silk Road*'s escrow occurred during the four years that the brand traded. Some of these were successful and contributed to technical innovation, including the development of escrow models capable of accommodating more than two parties (multi-signature escrow) and /or of decentralised escrow services via the use of peer-to-peer exchanges (Horton-Eddison and Di Cristofaro 2017).

3. *Silk Road* as a Community of Commerce

Like other crypto-markets, *Silk Road* makes use of established marketing techniques in order to ensure repeat business and attract new customers. These techniques range from advertising free samples of products for bulk purchases to publicising one-off or special deals, loyalty discounts for repeat customers and promotions during festive seasons. Prize-draws and raffles

are also regularly set up, with prizes tending to be a particular quantity of bitcoins³ and winners' names being announced in the markets. Moreover, in addition to serving transactional needs, these marketing techniques are some of the means by which *Silk Road*, and other crypto-markets, seek to promote a sense of community and belonging: their members are made to feel part of a select group who, through their choice of crypto-market, are privy to special deals (Afilipoaie and Shortis 2015).

Promoting a sense of community is also sought by referencing particular values. In the case of *Silk Road*, these are encapsulated within the market's self-proclaimed libertarian ethos.⁴ *Silk Road's* 'Dread Pirate Roberts', especially Ulbricht's, vision of the market was ideologically driven by 'agorism' – a radical anarchist philosophy that advocates that all relations between people are to be conducted on the basis of voluntary exchanges. For transactional relations, this means advocating state non-intervention at any level. Ulbricht conceived of *Silk Road* 'as a means to dismantle the state' (Munksgaard and Demant 2016: 78) and its members' mission as encompassing 'constructive activism as they sought to transform their values into built environments that were designed to socially engineer a more permissive digital reality' (Maddox et al 2016: 111). The *Silk Road* forums were a key discursive space in which this mission was promoted, with forum discussion threads about harm-reduction and libertarian commerce principles being commonplace and Ulbricht himself hosting a libertarian book club within one of them (Van Hout and Bingham 2014, Ormsby 2014). *Silk Road's* libertarian discourse grew from 2011 to the end of 2013, when *Silk Road 2.0* was seized, at which point it steeply declined and did not re-emerge (Munksgaard and Demant 2016).

Both libertarian commerce and community values are thus core to the *Silk Road* brand, making this crypto-drug market a prime example of what Boyd (2002) calls a community of commerce: one that integrates a community of interest with one of transaction. Interest-oriented communities are based on shared interest more than they are on shared social characteristics (Wellman and Gulia 1999). In communities of commerce, in contrast, shared

³Bitcoin is a crypto-currency and a digital payment system used across many crypto-markets. It permits the exchange of money without it being linked to a physical identity.

⁴ Illustrative of this ethos is the pseudonym chosen by *Silk Road's* founder, Ross Ulbricht: Dread Pirate Roberts. The choice was inspired by the hero character of the film *The Princess Bride* (1987), who is feared for his sword fighting powers but turns out to be a series of individuals who pass the name and fearsome reputation to successors as a means to scare their victims into surrender without engaging in combat (Afilipoaie and Shortis 2015).

interests are largely based on commerce, which provides the foundation for community members' relations. Similarly to e-Bay, the community of commerce examined by Boyd (2002), *Silk Road* community members 'join a social circle by virtue of buying and selling in the same category' (drugs, in this case), 'sharing experiences as sellers, or sharing some collecting interest on a bulletin board. In all of these situations, commerce is the basis for interaction.'

4. Methodology

4.1. Data

The data for this study comes from the *DarkNet Markets Archive*, which was compiled and released publicly by Gwern Branwen in 2015. Gwern Branwen summarises its contents as

a mirror of ~89 Tor-bitcoin darknet markets and forums 2011-2015, and related material (Bitcoin, Silk Road), created: 1 December 2013; modified: 8 March 2017; status: finished; confidence: highly likely.⁵

The Archive comprises a series of snapshots of the markets at the time that the 'mirrors' (i.e., copies) were made. From the over 4,438 mirrors available, we selected the *Silk Road* marketplace files and, within these, we used all the forum pages of the *Silk Road 1.0* and *Silk Road 2.0* archives in order to construct, respectively, two analytic corpora: SR1 and SR2.⁶ Our decision to focus on the forums, rather than the other main file type in the *Silk Road* archives - the vendors' profiles - was twofold. Firstly, we wanted to understand how the *Silk Road* community— rather than just its vendors – constructed trust. Secondly, although vendors' profile pages also contained users' views, specifically within their reviews section, these are known to be regularly faked (Tzanetakis et al 2016). Indeed, the forum pages that we examined contained numerous references to the bogus status of these reviews, warning users against trusting their content and authors. As one *Silk Road 2.0* member put it, 'Is it really possible to produce that many fake profiles and vendor feedback on over 20 receive packages, without an alarm bell is ringing on SR?'⁷

⁵ <https://www.gwern.net/DNM%20archives>

⁶Each of the texts in the SR1 and SR2 corpora is a 1:1 copy of the file that was at the time available on the server, i.e. the html file together with images and other website scripts and files, including .css files and Java scripts.

⁷Original spellings / wording from texts in the corpora are preserved throughout the article.

A schematic of the *Silk Road* marketplace structure is presented in Figure 1. Details of the *Silk Road* forums' corpora are provided in Table 1, which also includes details of a purpose-built reference corpus that we used in our study: the 'Drug Policy Making' (DPM) corpus. This comprised all the reports that were published by the United Nations Office on Drugs and Crime (UNODC) in 2012 and 2013, totalling 152,900 words.⁸ Texts within the DPM corpus were selected because of their containing supra-national drug policy makers' discursive representations of crypto-drug markets throughout the years that the *Silk Road* marketplace was in business.

Figure 1: The structure of the *Silk Road* Archive

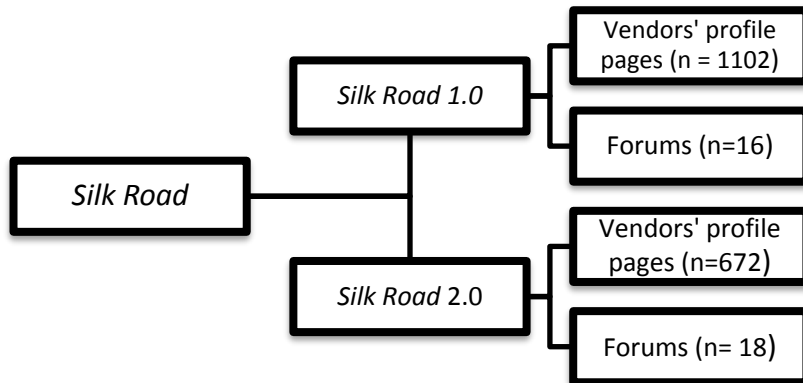


Table 1: Analytic (Silk Road 1 and Silk Road 2) and reference (Drug Policy Making) corpora

Corpora	Number of Tokens	Number of Types	Number of Texts
Silk Road 1 (SR1)	171,978,341	754,710	1,715,716
Silk Road 2 (SR2)	73,491,209	570,254	1,006,996
Drug Policy Making (DPM)	152,900	5,360	8

⁸The documents are the reports of the 54th, 55th, 56th and 57th sessions of the Commission on Narcotic Drugs (two documents per year). See: <http://www.unodc.org/unodc/en/commissions/CND/session/cnd-documents-index.html> (last accessed October 2017).

Using a combination of customised Python scripts and xidel⁹, we extracted the forum messages and their relevant metadata from the *Silk Road* archive, namely name of the author, date of posting, topic the post referred to, and name of the forum to which the post belonged. Metadata were left in the corpora to allow for subsequent query filters, for example, to limit searches to messages written by user ‘X’ in sub-forum ‘Y’. The textual data were then run through a Part Of Speech (POS) tagger (TreeTagger), which added the grammatical tag and lemma of each word. Finally, the corpora were loaded onto a local installation of the Corpus Linguistics software CQPWeb.¹⁰

The DPM corpus was built by downloading the UNODC reports from their website, converting them into plain text files by manually copying and pasting their content (excluding page numbers and indexes), and applying the same type of annotation (metadata) and tagging (POS) to the resulting text files as those used for the SR1 and SR2 corpora.

4.2. Approach and Procedure

Our study adopted a Corpus Assisted Discourse Studies (CADS) approach. This has proven useful for understanding the main discourses around a wide range of topics in digital media, from influence and ideology to immigration and social benefits (see, e.g. Ädel and Reppen 2008; Baker 2006; Baker et al 2013; Baker and McEnery 2015; Hoey, Stubbs et al. 2007; Lorenzo-Dus and Di Cristofaro 2016; Prentice et al 2012).

As its name indicates, CADS works at the interface of Corpus Linguistics methods and Discourse Studies theories and analytic concepts. CADS typically follows an inductive, ‘serendipitous’ journey of discovery (Partington 2006:12). In this study, research into the notions of cyber-trust, cyber-communities, crypto-drug markets and the *Silk Road* brand informed the software enabled searches of our corpora. Thus, acting like a “kaleidoscope” (Kenny 2014:14), use of corpus-based techniques enabled us to “zoom in and out [action] from the general to the particular and back again” (Kenny 2014:68). This allowed a fine-

⁹ <http://www.videlibri.de/xidel.html>

¹⁰ <http://cwb.sourceforge.net/cqpweb.php>

grained close reading of the texts in our corpora, while taking into account their wider contexts.

We commenced by using CQPWeb to calculate distributional information (general quantifications and word frequency lists)¹¹, ‘funnelling’ down progressively closer to the individual texts (Marchi 2010). For this we relied on the concordancing tool in CQPWeb. Concordance lists (also known as KWIC - Key Word In Context) enable examination of actual occurrences of use of a given target word, together with other terms it repeatedly co-occurs with – that is, its collocates. These are important because the meaning of a word is defined by the relationships it establishes with other words ‘which tend to occur in its environment’ (Leech 1976:20). We also conducted keyword analyses of search terms that were saliently linked to trust development and assessment in the corpora. These entailed examining extended concordances manually, with a focus on identity construction. We approach identity as being socially constructed (e.g. De Fina et al 2007). This entails placing one’s identity – and that of others – in the ongoing discourse – a practice that we examined in this study via the notions of positioning and stance (Bucholtz and Hall 2008). Specifically, and following Anton and Peterson (2003) and Garcés-Conejos Blitvich et al (2013), we examined identity construction in terms of the subject positions that we claim for ourselves (self-asserted) or that are attributed to us by others (other-asserted) in discourse.

The above analytic steps were guided by a dual comparative purpose, namely (i) between SR1 and SR2, and (ii) between SR1 + SR2 and DPM. Interest in (i) is justified by the fact that the *Silk Road 1.0* take down in 2013 led to increased, administrator-driven security measures in *Silk Road 2.0*. We wanted to find out whether and, if so, how this technical development in the marketplace related to members’ discursive constructions of trust in the SR1 and the SR2 corpus. As for (ii), the comparative interest here resided in a long-standing debate within the field of drug policy regarding the effectiveness or otherwise of interdiction-based policies (see, e.g., Bewley-Taylor 2017).

5. Results

5.1. Trust and Vendors in *Silk Road*

¹¹Frequencies of use were normalised to PMW (Per Million Words) to enable comparisons.

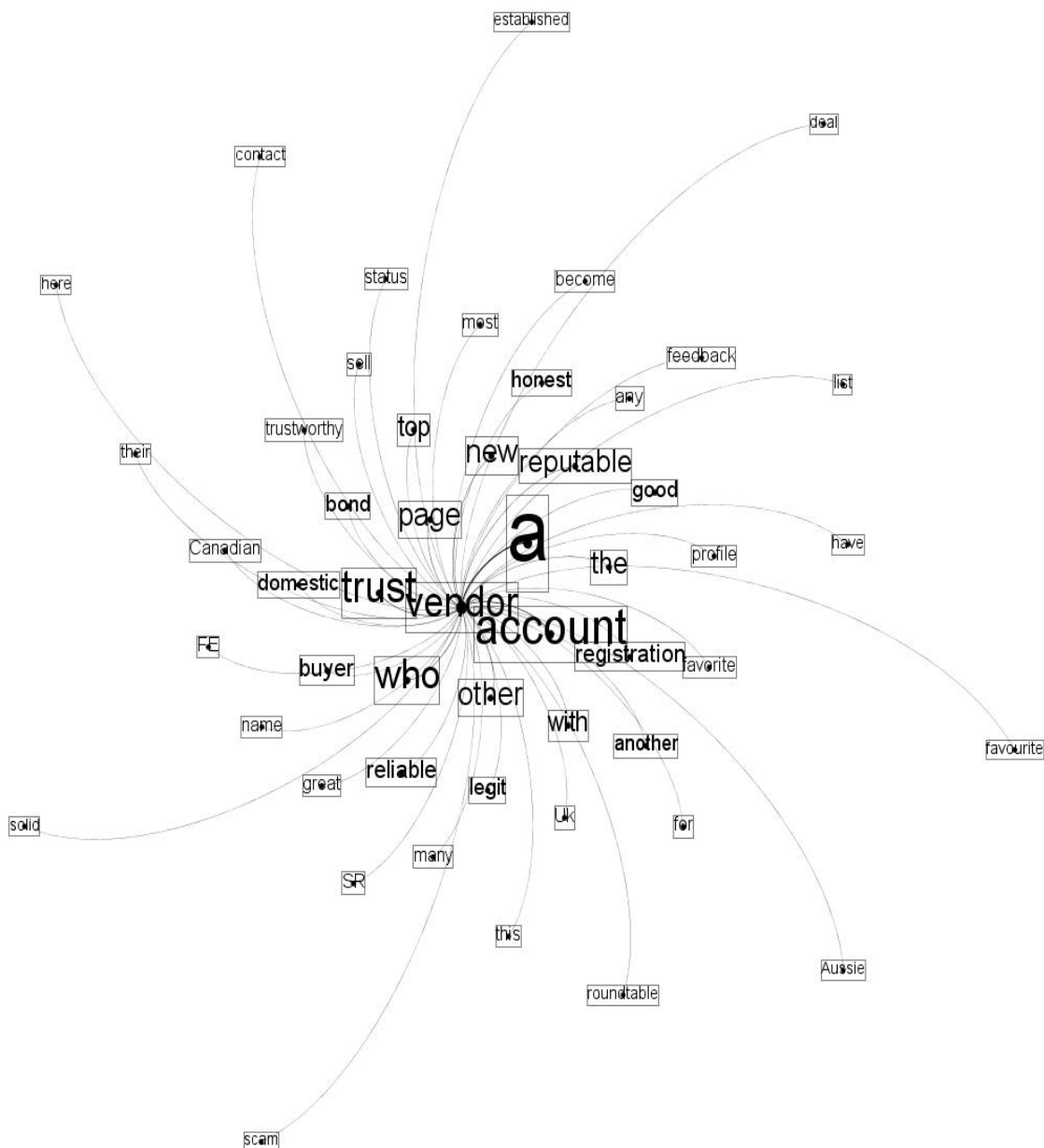
In order to examine how the *Silk Road* community constructed trust discursively in relation to those members who sold drugs therein, we first needed to identify how these members were designated across our corpora. To do this, we were initially guided by the ‘official’ name used in *Silk Road* to refer to them, namely ‘vendor’. This is reflected, for example, in *Silk Road*’s website structure, which includes ‘vendors’ pages’ and ‘vendors’ profiles’. Using frequency lists as our starting point, and as shown in Table 2, we identified the lemma *vendor* as the most frequent term in SR1 and SR2 to refer to those who sell drugs in *Silk Road*. Other lemmas included *dealer* and *trafficker*. As Table 2 also shows, however, their frequency of use was much lower.

Table 2: Frequency of use (raw frequency and PMW) of lemmas referring to those selling drugs across the three corpora

Lemma	SR1	SR2	DPM
<i>vendor</i>	398,862 (2,319.26 PMW)	186,055 (2,531.66 PMW)	0
<i>dealer</i>	19,285 (112.14 PMW)	7,145 (97.22 PMW)	0
<i>trafficker</i>	633 (3.68 PMW)	353 (4.80 PMW)	6 (39.24 PMW)

In addition to displaying much lower frequencies of use, KWIC analysis of *trafficker* and *dealer* revealed that the former was only used in the context of reporting mainstream news, and that the latter was used to refer to the activity of selling a wider range of products (e.g. electronics equipment). As for the DPM corpus, it contained no occurrences of any lemmas that designated those selling drugs in crypto-drug markets. Instead, and comparatively infrequently, the DPM corpus referenced the activity they perform through the gerund form of the verb ‘to traffic’ (‘trafficking’, PMW frequency: 1678.38), and hence denoting the illegality of the markets.

KWIC analysis of the lemma *vendor* showed that it was used similarly across the two *Silk Road* corpora, both in frequency terms and in relation to its statistically significant collocates. Note, in Table 2, the respective PMW frequency figures for *vendor* in SR1 and SR2: 2.319 and 2.531; and in Figures 2 and 3, the visualisation of its top 50 collocates in SR1 and SR2. The relationship of each collocate to the central node *vendor* is graphically represented so that



As Figure 2 shows, key *vendor* collocates included ‘trust’, ‘reputable’, ‘favorite’, ‘established’, ‘rogue’ and ‘top’ in SR1. Similarly, Figure 3 shows ‘reputable’, ‘reliable’, ‘trust’, ‘legit’, ‘trustworthy’ and ‘honest’ to be key collocates in SR2.¹²

Illustrative examples of some of these collocates are presented in examples (1) – (4).

¹² KWIC analysis of the top 50 collocates of *vendor* shown in Figures 2 and 3 also showed less explicitly obvious collocates to be discursively tied to concept of trust, such as ‘domestic’, ‘new’ and ‘good’.

(1) ‘there ya go. easy enough. didn’t think reputable vendors were so shitty but it turns out they are’ [SR1]

(2) ‘I have seen very reputable vendors turn into scammers...I feel for those that have been scammed’ [SR1]

(3) ‘its good to have trustworthy vendors, just dont trust anyone too much’ [SR2]

(4) ‘they make it easy to post fake listings, and allow fake vendors to post a ton of faked padded feedback, and do nothing to help people who get robbed and tricked’. [SR2]

Our analysis of the lemma *vendor* revealed that *Silk Road* community members engaged explicitly and repeatedly in other-asserted positioning acts (Anton and Peterson 2003) about vendors alongside the trust – risk end poles of the trust continuum. References to vendors who were ‘reputable’ and ‘trustworthy’ abounded in the corpora - see examples (1) and (2). Yet so did references to those vendors who were not thought to be so, and who were positioned as having ‘shitty’ (1), turning into ‘scammers’ (2), and ‘fake’ (4) identities. Moreover, these other-asserted positioning acts were regularly embedded within posts in which community members simultaneously engaged in self-asserted positioning. They openly shared their experiences (‘I have seen ...’ (2)), their feelings (e.g. empathy ‘I feel for those who ...’, (2) and their viewpoints (‘its food to have...’ (3), ‘they make it easy to... and allow..., and do nothing..., (4)). They also often provided advice on trust as a performative action: ‘just don’t trust anyone too much’ (3).

5. 2. Trust and Drug Users in *Silk Road*

As in the case of vendors, in order to examine how trust was constructed in relation to those engaged in buying and using drugs in our corpora, we firstly identified how they were labelled therein. In this case, the three principal lemmas were *user*, *buyer* and *consumer*. Table 3 lists their frequency of use across the SR1, SR2 and DPM corpora.

Table 3: Frequency of use (raw and PMW frequency) of lemmas referring to those buying / using drugs across the three corpora

Lemma	SR1	SR2	DPM
<i>buyer</i>	117,971 (685.96 PMW)	31,402 (427.29 PMW)	0

<i>User</i>	62,439 (363.06 PMW)	28,120 (382.63 PMW)	43 (281.23 PMW)
<i>consumer</i>	2,818 (16.39 PMW)	1,517 (20.64 PMW)	8 (52.32 PMW)

In frequency terms, Table 3 shows once again a clear difference between crypto-drug market and drug policy making referencing of those buying/using drugs. The lemmas *buyer* and *user* displayed high PMW frequencies of use in both SR1 and SR2: *buyer* (SR1 – 685.96; SR2 – 427.29), *user* (SR1 – 363.06; SR2 – 382.63). For its part, *consumer* was the least frequent of the three lemmas in SR1 (16.39 PMW) and SR2 (20.64 PMW).

No instances of the lemma *buyer* were found in the DPM corpus, in which the lemma *consumer* was also sporadically used (52.32 PMW). The most frequent of the three lemmas therein (281.23), *user*, was always used in the DPM texts in relation to organisations, agencies or countries, as example (5) illustrates.

(5) ‘... for addressing HIV prevention , treatment , care and support among drug users and in prison settings , Recalling General Assembly resolution 65/180’
[DPM]

In addition to being highly frequent in SR1 and SR2, *user* and *buyer* were often discussed in trust-risk terms in the forums. KWIC analyses revealed that, via self- and other-asserted positioning acts, drug users’ identities were primarily constructed in terms of expertise, integrity and benevolence – the same features identified within surface net contexts for assessing trustworthiness (Hendriks, Kienhues and Bromme 2015; Section 2). Two considerations are worth discussing in more detail.

Firstly, drug users’ expertise was constructed through self-asserted positioning acts that relied on personal experience and ‘externally sourced’ knowledge, the latter coming primarily from scientific and media publications, as (6) and (7) illustrate:

(6) Hey, I'm around 6ft, every bit of 250+ lbs. [...] This will be my FIRST experience with MDMA. I am a daily cannabis user, frequent cocaine user (8ball every week, spread over 2-3 nights), experienced shroom user , and frequent drinker . I tried what was supposed to be E back in high school like 10 years ago, however it had no

effect on me back then [...] I feel like I 'm ready to handle whatever MDMA can throw at me. I want to eat the whole 200mg pill for new years at once. My girl is insisting we break in half, then take other half later. [SR2]

- (7) Researchers at Harvard University medical school in Boston recruited 65 college students who reported they were "heavy" users, having smoked marijuana a minimum of 22 out of 30 days prior to testing, and 64 who were "light" users, smoking a maximum nine days of the last 30. Subjects were supervised overnight to allow any drug in their system to wear off, and on the second day underwent a battery of neuropsychological tests. The heavy users of marijuana showed greater impairment than light users on attention/executive functions, particularly on tasks such as card sorting and learning word lists. The differences remained after they controlled for factors such as different levels of cognitive functioning before beginning drug use, and the use of alcohol and other substances. [SR2]

Example (6) is typical of *Silk Road*'s community members disclosing personal information in the forums, including details regarding weight and height ('around 6ft, every bit of 250+lbs), which are important to health risk-minimisation when dosing. The example is also typical of the narrativisation of experience as positioning, here regarding years of drug use and drug types: 'I am a daily cannabis user, frequent cocaine user [...] I tried what was supposed to be E back in high school like 10 years ago, however it had no effect on me back then.' Use of first-hand narratives as positioning devices when claiming expertise is a common practice across broadcast and digital media (Lorenzo-Dus 2009, Thornborrow 2015).

Example (7), for its part, is typical of *Silk Road*'s community members' inclusion of scientific information within their self-asserted positioning acts as a mean to claim expertise in relation to drug use. On this occasion, the author of this post reported the methodology and findings of an academic study conducted at a prestigious university with a considerable level of detail (the whole post does this), which s/he relayed using technical / scientific terms, such as 'battery of neuropsychological tests' and 'attention/executive functions'. The post conveyed a close reading of the reported study, from which the post author self-asserted his/ her position as an expert and, through that, may have sought to claim trustworthiness.

Secondly, integrity and benevolence factors overlapped significantly in the discourse around drug users in the SR1 and the SR2 corpora. As noted in Section 2, these factors refer to norms and standards of given – rather than across all - professional groups. In the *Silk Road*

forums, they were discursively constructed via recurrent, explicit advice giving / seeking on drug use that were primarily geared towards minimising health risks, as example (8) illustrates.

(8) The pill-warning that that was posted here and on SR is also valid for these ones - very, very strong. 150mg is very realistic. I had 2/3 of one and was rolling pretty intensively despite being male and having a body weight of about 80kg. Perhaps I am only sensitive, but in case you are not a regular user, be careful not to drop a whole thing, especially if you are female and have a lower body weight. [SR2]

The post author in (8) worded his / her advice so as to minimise potential face-threat to *Silk Road* community members, specifically seeking to avoid being perceived to impose upon their negative face needs.¹³ Thus, he/she softened the potential face threat of the imperative ‘be careful not to’ via use of hedging (‘perhaps I am only sensitive’), a conditional clause (‘in case you are not a regular’) and a grounding in the form of references to personal experience (‘I had 2/3 of one and was....80kg’).

5.3. Trust and the Marketplace in *Silk Road*

Having presented the results of our analysis of how trust was discussed in relation to those selling and using / buying drugs in our corpora, we now focus on how the *Silk Road* community members positioned themselves and others in relation to the issue of trust in the marketplace. To do this, we focused on the lemma *escrow* and on the words linked to its monetary mediation, namely the currency-related words bitcoin and bitcoins, and their respective abbreviations (BTC, BTCs).¹⁴ The frequencies of use of these search terms across the three corpora are listed in Table 4.

Table 4: Frequency of use (raw and PMW) of *escrow*, bitcoin/s, BTC/s across the three corpora

¹³ The terms ‘face-threat’ and ‘negative face needs’ are used here in the sense of linguistic politeness (e.g. Brown and Levinson 1987)

¹⁴Owing to space limitations the results of the KWIC analysis of these currency terms is not reported here.

Lemma/words	SR1	SR2	DPM
<i>escrow</i>	34,527 (200.76 pmw)	30,592 (416.27 pmw)	0
bitcoin/bitcoins	79,309 (461.16 pmw)	27,492 (374.09 pmw)	0
BTC/BTCS	38,613 (224.52 pmw)	15,803 (215.03 pmw)	0

As Table 4 shows, the DPM corpus did not contain any references to either *escrow* or to currency terms in crypto-drug markets. Even acknowledging the policy orientation of these documents, this was a somewhat surprising finding. Escrow services and currency are, after all, the main features of crypto-drug markets systemically and technologically.

Currency-related terms displayed similar frequencies of use in SR1 and SR2: bitcoin/s 461.16 and 374.09 PMW in, respectively, SR1 and SR2; BTC/S 224.52 and 215.03 PMW in, respectively, SR1 and SR2. This was to be expected as the same currency was used across the entire period being examined. In contrast, the lemma *escrow* was considerably more salient in SR2, doubling its PMW frequency of use from 200.76, in SR1, to 416.27. Importantly, the analysis of the collocates of *escrow* (and of its occurrences) across SR1 and SR2 revealed a noticeable change in stance towards this service. SR1’s community members’ stance towards *escrow* was overwhelmingly positive. This was evident, amongst other, by the saliency of the *escrow* + protection collocation in the SR1 corpus (rank 24th).

Example (9) illustrates the positive stance of *escrow* in SR1. In it, the post author engages in a self-asserted positioning act that provides a clear personal endorsement (‘I’d never go anywhere else’) of *Silk Road 1.0* on grounds of both the market’s ‘wide array of quality products’ and its ‘fucking awesome’ escrow system.

- (9) I’d never go anywhere else because SR was the most sophisticated of all the drug sites and had a wide array of quality products. And the fucking escrow system was fucking awesome [SR1]

In sharp contrast, KWIC analysis of *escrow* in SR2 showed that the lemma was primarily tied to a negative stance. Amongst its key collocates were a number of lemmas related to either security risks and / or an absence of security, such as *steal* (213 occurrences, rank 37th) and

hack (138 occurrences, rank 66th). Analysis of the occurrences of these key collocates revealed pressing concerns among the SR2 community regarding the escrow service, as shown in (10):

- (10) Shit! I hope you were not one of the accounts that lost escrow funds through being hacked? If you were I will work with you to refund you what you are owed from my order as agreed! [SR2]

Alongside concerns for escrow being responsible for loss of funds, the post's author— a vendor – in (10) seeks to reinstate trust in him/her by reassuring his/her customer of a refund. The vendor strategically mobilised pronominal and verb form choices in order to distance himself/herself from any responsibility: the passive voice phrase 'what you are owed' implicitly placed the marketplace as the responsible agent and the vendor as a circumstantial party ('from my order'). The vendor also based his/her self-asserted positioning act on the value of integrity, specifically honouring a contract ('as agreed'). Through the commissive speech act 'I'll work with you', furthermore, the vendor positioned himself/herself as benevolent (helping other *Silk Road* community members). S/he created an in-group (vendor – buyer) social-based trust group against the systems-based trust aspect of the marketplace, the security of which had been compromised ('lost escrow funds through being hacked'). This example thus illustrates how *Silk Road* community members positioned themselves within a discourse that sought to address perceived threats to the trust-enabling technical systems of the marketplace.

Analysis of another salient collocation of *escrow*, namely *centralized*, enabled us to further nuance the stance change in SR2 with respect to its systems-based trust. In SR1 the *escrow + centralized* collocation only displayed four occurrences (rank 516th), possibly because the centralised model was the only one in operation so there was no need to specify its features. In contrast, in SR2 the same collocation became both quantitatively more salient (252 occurrences, rank 12th) and explicitly tied to a highly negative stance, as examples (11) and (12) illustrate:

- (11) Statistically speaking, almost all centralized escrow markets eventually end up ripping off everyone for all the coins [SR2]
- (12) Silk Road will never again be a centralized escrow storage. This week has shown the collateral damage we can cause by being a huge target [...] Multi-signature transactions are the only way this community will be

protected long-term. I am aggressively tasking our devs on building out multi-sig support for commonly-used bitcoin clients. Expect a generous bounty if you have the skill to implement this. [SR2]

In (11) and (12) the centralised escrow model was discursively represented as no longer trustworthy in economic ('ripping off everyone for all the coins', (11)) and community terms (making *Silk Road* users 'collateral damage... a huge target', (12)). Both examples also illustrate a collocation pattern in SR2 that pointed towards innovation in crypto-drug markets, specifically the adoption of different, hitherto not used escrow models. In example (11) the temporal adverbial 'eventually' and the phrasal verb it pre-modifies ('end up') signalled the past (centralised escrow) in an implicit before-and-after construction. In example (12), the centralised escrow model was declared defunct ('*Silk Road* will never again be a centralized escrow storage') and an explicit time reference for this was provided ('this week'). This referred to a major theft of bitcoins from *Silk Road 2.0* on 13th February 2014, which led to new models being adopted ('multi-signature transactions') and linked to positive discourses of trust ('this community will be protected long-term'). Example (12) is indeed illustrative of a number of frequent collocates of *escrow* in SR2 that contained positive discourses around these new escrow models, specifically 'decentralized' (75 occurrences, rank 55st) and multi-signature ones (*multi-sig/multisig*: 384/254 occurrences, rank 8th and 9th; *multi-signature* 71 occurrences, rank 47th).

6. Concluding remarks

The study reported in this paper sheds new light upon how the community members of crypto-drug markets constructed the concept of trust in *Silk Road*. Informed by a corpus and discourse analysis of a c. 250 million word dataset, our study reveals that *Silk Road 1.0* and *Silk Road 2.0* community members regularly performed other-asserted positioning acts that placed vendors alongside the trust – risk end poles of the trust continuum, explicitly identifying both their 'good' and 'bad' practices. This, we argue, contributed to strengthening the *Silk Road* community around a shared interest: identifying and characterising vendors who may / may not be trusted. Importantly, and given *Silk Road*'s community of commerce status, it also contributed to maintaining trust in the marketplace by reassuring its members that vendors who 'misbehaved' were openly exposed in the forums.

Our findings also reveal that the *Silk Road* community engaged regularly in discussion about the drug user identity, primarily through self-asserted positioning acts, alongside the trust–risk

axis. *Silk Road* members overtly talked about and provided advice to one another, especially in matters relating to health and personal harm reduction when using drugs. Across the SR1 and SR2 corpora, advice giving was primarily worded non-judgementally, often seeking to minimise face imposition on other community members. In both corpora, integrity and benevolence values were saliently linked to drug users' self-asserted positioning acts. This was another discursive means by which the *Silk Road* community sought to establish trust in the marketplace.

As for the discursive construction of trust around the *Silk Road* marketplace's systemic and technical features, our results provide linguistic evidence of a significant change in crypto-drug markets. The SR1 corpus contained primarily positive discourses around the escrow service, and did not significantly include discussion about decentralisation or multi-signature escrow models. In the SR2 corpus, in contrast, discussion featured both a marked negative stance towards 'traditional' (i.e., centralised) escrow and a desire to move towards 'new' (i.e., decentralised and/or multi-signature) models. In as much as these new models are based on disassociating third-party arbitration/financial management (escrow) from the central site control, they represent an important technological innovation within crypto-markets.

In addition to providing (to our knowledge) the first systematic linguistic analysis of trust in crypto-markets, we believe our findings may prove significant to law enforcement and public policy professionals. Hard law enforcement strategies – here reflected in the FBI's *Silk Road 1.0* service seizure – are generally applied to crypto-drug markets. Such interdiction measures may be justified in terms of both these markets' illegality and a perceived lack of internal regulatory practices. There is, however, no prior evidence of what actually goes on communicatively in these markets, including how members may seek to regulate their own practices. Our results show that internal, 'self-regulatory' discourse practices do exist and that they are principally geared towards strengthening the community's interest-oriented and transactional-oriented needs and thus to maintaining trust within *Silk Road*.

Our findings suggest that hard law enforcement may provide crypto-drug markets with an incentive for technological innovation. In the words of the moderator of one of the *Silk Road 2.0* forums: 'Make yourself at home here, regroup and do it again. Show them that you, we. Are a hydra – cut off one head and ten more spring up.'¹⁵ In our study, this was evident in

¹⁵<http://www.swansea.ac.uk/media/GDPO%20SA%20Darknet%20Threats%20FINAL.pdf>

relation to the different discourses around escrow before and after the FBI take down of *Silk Road*. Law enforcement and policy making may therefore consider questioning whether ‘quick wins’ derived from crypto-drug market site seizures really pay off in the mid or long term.

Finally, our results point to a clear disconnect between policy-making (CDM corpus) and the discursive reality of the very crypto-drug markets that this may seek to legislate (the SR1 and SR2 corpora) in at least two respects. Firstly, the systems-based feature that drives innovation therein (escrow) was conspicuously absent from policy makers’ discourse about crypto-drug markets. Secondly the core activities of those markets, namely buying and selling drugs, were de-agentivised in these highly strategic and influential policy documents – identity labels for drug users and vendors were conspicuously absent therein (see Tables 3 and 4). Given that the policy-making documents we considered primarily focused on legislation, there is a clear mismatch between the discourses around key agents in the activities that concern both the users of crypto-drug markets and those who seek to develop legislation about them, specifically their abolitionn.

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