

Professionally Yours: Anonymity, Trust, and Self-Portrayal on the Deep Web

Abstract

The *deep web* (DW) is the collective data, forums, and websites on the unindexed internet. The DW provides an online environment that allows users to participate in illicit transactions with greater security and anonymity than that available on the surface web. Multiple DW marketplaces have been established, specializing in black market wares – ranging from drugs and weapons to pornography and forged documents. DW traffickers work to create a reliable, trustworthy persona to establish credibility and present a professional veneer for engaging with potential and current customers. In this paper, we investigate the mechanisms of anonymity, trust, and traffickers' self-portrayal as reputable and reliable businesspeople on the DW. We show that even though DW traffickers involve in illegal activities, both the trust mechanisms and the strategies deployed for the establishment of seller reputations on the DW are, with a few nuances, similar to those adopted on the 'surface-web' marketplaces.

Keywords

Anonymity; self-portrayal; deep web; internet commerce; computer-mediated communication

The Deep Web: An Overview

The *deep web* (DW) is the collective data, forums, and websites on the unindexed internet. Information contained on the DW is not indexed by commonly utilized search engines (i.e., Google, Yahoo, etc.) and therefore remains inaccessible to the average internet user. Parts of the DW have been appropriated for organizational and business use, including the creation of black markets, networks to facilitate the distribution of illicit materials, and organized crime.

The DW is accessed with a variety of software suites, meant to facilitate connections through multiple computers and afford users greater anonymity and security than 'surface' web browsers. The nature of the DW makes cataloging sites and services a difficult task: The URLs used for navigation deviate greatly from the commonly-encountered surface-web template (i.e., www.google.com). DW URLs utilize the *.onion* top level domain, and are typically a lengthy hash (rarely betraying the site to which they direct). Among *.onion* sites readily accessible are image boards specializing in child pornography, black markets, purported assassins offering their services, and counterfeit and forged currency and official documents.

In this paper, we investigate anonymity, trust, and traffickers' self-portrayal on the DW. Toward this goal, we perform a qualitative analysis of two DW marketplaces, Silk Road and Black Market Reloaded, and perform a qualitative case study one trafficker's self-portrayal as a reputable and reliable businesspeople.

Anonymity and Trust in the Deep Web Marketplaces

On the surface web, establishment of trust is crucial for the success of reputation systems (e.g., eBay, e-pinions) (e.g., Jøsang, 2007; Jøsang et al., 2007). In spite of their involvement in illegal activities, DW marketplaces are observably aware of this fact. For this reason, technological affordances are provided on the DW to allow for trust building. The two largest black markets on the DW are *Silk Road* (SR) and *Black Market Reloaded* (BMR). Both offer similar wares, with one key distinction: BMR allows the sale of weapons, while SR eliminated weapons sales in December 2012. Otherwise, both offer forums accessible to buyers and sellers, standard selling templates, and an internal messaging system. While the sites make a business of offering illegal goods, they treat transactions essentially the same as a surface-web marketplace, providing protections to buyers and sellers, and standardizing business practices amongst users. BMR and SR have instituted protections to buyers and sellers in an attempt to minimize scamming and theft. Central to the buying experience is an escrow service, so that when buyers 'pay' a seller, funds are held in escrow for a set period of time before being released. Each site also offers a

rating system, from which an overall ranking and satisfaction percentage are calculated, and publicly available.

To further enhance trust and reputation building, sellers are given a template onto which they may post information pertinent to potential buyers. In addition, most sellers offer their public PGP key, should buyers wish to contact them. Oftentimes, a link to a tormal email address is provided for off-site (and presumably secure, encrypted) communication between a buyer and a seller. Included on the seller's page – in addition to their own written introduction -- are links to currently-listed items for sale, and user reviews. Like on eBay, reviews are only a sentence or two, meant to give prospective buyers an idea of what their transaction experience will be like. As with other legitimate marketplaces, BMR and SR both rely on user feedback to help purchasers make educated decisions about how, and with whom, to spend their money – and to incentivize good behavior among market participants. Reputations that rely upon buyer feedback can “discourage entry by bad types in markets;” while the system used to glean feedback legitimizes and quantifies the transaction experience (Resnick et. al., 2001). Our work thus shows that, even when selling illegal wares, surface web rules of reputation and trust still apply.

One distinction between DW and surface web marketplaces, however, is related to anonymity: While real world identity may be an important factor in surface web marketplaces, complete anonymity is instrumental to maintain on the DW. On the DW, measures are taken to ensure anonymity without affecting trustworthiness. For example, while reviews of wares are anonymous, they are aggregated and displayed on sellers' profile pages. In addition, for an added layer of anonymity, both SR and BMR rely on a digital currency, “*Bitcoin*,” for all transactions, and ‘launder’ Bitcoin transactions. Users are assigned digital wallets to, and from, which they may deposit money. Numerous online exchanges (similar to internet cambios) are available, with transferring USD to BTC taking anywhere from one hour to a business week.

Trafficker Self-Portrayal

We also investigate seller self-portrayal on the DW via the case study of Cherryflavor, one of the most prolific and ostensibly successful weapons traffickers on BMR. Initial analyses show that Cherryflavor takes care in creating a professional profile to instill confidence in buyers, and has gained a reputation on the forums (and in transaction reviews) for being ‘accessible,’ ‘communicative,’ and ‘honest.’ He has been a member since 2012-12-10, and is identified by BMR as a “level 2 seller.” Unlike other traffickers, Cherryflavor emphasizes the importance of relying on the BMR escrow system and requires all purchasers to utilize it. Especially in a sales area rife with scammers, this behavior alone sets Cherryflavor apart from other sellers. From Cherryflavor' profile, information on the most recent firearms transactions are accessible. Additionally, Cherryflavor encourages purchasers to document their buying experience on the BMR forums and reliably responds to their concerns in a timely manner. In our work, we document these interactions and show how Cherryflavor is able to maintain his selling reputation.

Conclusion

In this paper, we have shown how anonymity and trust play a crucial role in DW marketplaces and how the same rules with regards to these concepts on the surface web apply to the DW, but not without nuances. We also showed that like any astute businessperson, Cherryflavor is aware that offering superlative customer service – grounded, straightforward and honest communication – is key to maintaining a strong sales reputation, retaining customers, and gaining future buyers. We acknowledge the limits of a mere qualitative analysis of unraveling the nature of these concepts and plan to enhance our work quantitatively in the future. What is most striking about our work, we believe, is that it investigates the three concepts of anonymity, trust, and self-portrayal in a totally new online environment—that of the DW. We hope that our work will trigger more interest in studying the DW.

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