What Does Your Online Pharmacy Signal? A Comparative Analysis of Website Trust Features

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Abstract
The growth of electronic commerce has offered a new channel for the commercialization of pharmaceutical products. While regulated online pharmacies offer convenient distribution of drugs, unregulated online vendors create risks for consumers by promoting medicines of unknown origin and jeopardizing sensitive medical information. Using the signaling theory and a comparative content analysis, this study examines a set of website trust features that distinguishes regulated and unregulated online pharmacies. This investigation is aimed at identifying observable signals that online pharmacies use to induce trust. The results enhance our understanding of trust related signals and help online buyers and regulatory institutions in the evaluation of online pharmacies.

1. Introduction
Technology is seen as a facilitator of transformation in health related organizations both nationally and locally [1]. The development of electronic commerce has provided pharmacies with a new means of the distribution of pharmaceutical products. Since pharmacies are able to enter online markets freely, combating the sale of medicines of unidentified quality has become more challenging. Online pharmacies contribute greatly to illegal and counterfeit drug distribution: drugs of unknown origin worth $39 billion are sold online annually [2]. Illegitimate online commercialization of pharmaceutical products puts into question the security of existing drug supply chains. On the one hand, online pharmacies offer a more convenient distribution alternative than their physical counterparts. On the other hand, they may introduce unexpected risks to consumers by offering counterfeit medicines that lack key ingredients or contain poisonous substances.

The legal system is capable of handling counterfeiting in the offline world where counterfeit products are seized and counterfeiters are prosecuted. However, existing laws do not work or are more difficult to enforce in the borderless and anonymous world of the internet [3]. Past studies report that 50 percent of online pharmacies operate without license, 33 percent do not have policies in place to protect their customers, and many do not provide a contact address and phone number, and hide from law enforcement [4]. According to the World Health Organization [5], medicines purchased over the internet from websites that conceal their physical address are counterfeit in more than half of the cases.

Internet technology challenges the ability of buyers to evaluate the trustworthiness of an online seller because the cost of sending market signals is greatly reduced [6]. In addition, the internet introduces openings for information asymmetry between a seller and a buyer. Since buyers cannot examine the product before purchasing, it is very easy for merchants to manipulate website features to create an illusion of trustworthiness and credibility.

Our objective is to examine specific signals that online pharmacies use to induce trust and to encourage online consumers to engage in online transactions. We expect that online pharmacies will facilitate establishing trust with consumers by providing observable signals through specific website trust features. We address this research question using a content analysis of existing pharmaceutical websites. To the best of our knowledge, empirical up-to-date evidence has not focused on website trust features in the context of online pharmacies.

The results of this research have theoretical and practical implications. At the theoretical level, this study conceptualizes the nature and role of website trust features as mechanisms for signaling trust in situations of information asymmetry. At the practical level, the results help inform online users, pharmaceutical companies and regulatory institutions on the type of trust features that regulated and unregulated online pharmacies use.

This paper is organized as follows. In the next section, we provide a theoretical background of information asymmetry, signaling theory and website trust features. Then we introduce the hypotheses, followed by a description of the methodology and the results section. We conclude with the discussion and implication of our findings and with suggestions for future research directions.
2. Theoretical Background

2.1 Information Asymmetry

Electronic markets are characterized by the lack of transparency where consumers’ understanding of a product solely depends on a seller’s representation [7]. Lack of transparency leads to opportunistic behavior on the internet that is greatly powered by the asymmetry created as a result of the unequal distribution of information between online trading parties. In buyer-seller relationships, examples of opportunistic behavior include distortion of the real characteristics of goods, incomplete disclosure of information, misrepresentation of actual product quality and failure to acknowledge warranties [8]. Opportunism in online pharmacies may take a form of selling unapproved drugs, drugs that have not been stored or shipped correctly, contaminated drugs, drugs containing the wrong active ingredient or no ingredient at all, and drugs that are packaged in bogus packaging that looks legitimate [9].

In this study, we focus on one of the aspects of information asymmetry, namely adverse selection which refers to the situation when one party claims the ability to provide a high quality product or service when in fact it lacks the skills to do so [10, 11]. In buyer-seller relationships adverse selection arises pre-contractually as a result of hiding the true quality of products and misrepresenting true characteristics of a seller in order to obtain undeserved profits [12]. Adverse selection is powered by the use of quality signals that reveal either the true identity of a company or an image that the company intends to promote. Quality signals can be conveyed in the form of brand name, advertising expenditures, warranties and other cues that affect buyers’ perceptions and choice [11].

Adverse selection takes place in situations when buyers shop for experience products - products whose quality can be assessed only after the purchase [11]. The quality of pharmaceutical products is difficult to evaluate before the purchase as a certain level of expertise is required to do so [12]. Because pharmaceutical products are directly related to patient’s health, buyers are prone to paying more attention to details and to systematically analyzing product information [12]. Moreover, the fear of purchasing counterfeit drugs may encourage buyers to thoroughly examine the website and product details. Thus, low quality pharmacies trying to convey an image of high quality sellers may try to mitigate uncertainty by using trust inducing signals as part of their website design.

2.2 The Role of Signals

According to Grewal et al. [13], online stores have limited ability to signal trust due to their incapacity to convey longevity in the marketplace. Unlike physical stores that require significant investments into property, personnel and inventory, online stores enjoy low entry cost and are relatively easy and inexpensive to maintain. The minimal expenses required for entering and exiting online marketplaces create doubts for consumers as they are uncertain if the online retailer will stay in business for a long time [14]. The anonymity provided to the seller by the very nature of the internet creates ambiguity and does nothing to alleviate the buyer’s apprehension. The true identity of the seller can be hidden by domain names, fake addresses, and distorted information—the inability of the buyer to distinguish between true and false increases consumer uncertainty [7].

Identifying deception when medicines of unknown quality and safety are present requires online consumers to recognize fraudulent sellers and counterfeit merchandise without physical inspection. In order to do so, potential consumers must be able to interpret the information signals about the sellers and their products that is provided through the websites [15]. Signals are created by sellers to hide private information about their true identity; buyers, on the other hand, act as recipients of these signals and examine them to evaluate the credibility and validity of sellers’ true characteristics [12]. Signaling theory [16] explains environments with incomplete information and analyzes the relationship between signals and qualities, showing why some signals are reliable and others are not [17]. For a signal to be reliable, it should be perceived by buyers as a credible commitment of a high quality seller that cannot be easily imitated by a low quality seller [12], and the costs of deceptively fabricating the signal must surpass the benefits of falsifying it [17].

A central part of signaling theory is the analysis of signal reliability. Signals are classified into two categories: assessment and conventional signals. Assessment signals are essentially reliable because producing the signal requires significant effort [17]. For example, brand name is difficult to falsify, as companies with strong and reliable brand names have been around for a long time and have invested a significant amount of effort to build brand equity including advertising and product design [11]. In contrast, conventional signals are not essentially reliable [17] as they are relatively easy to falsify. For example, to create an illusion of trustworthiness, websites may provide bogus privacy, security, and return policies by copying them from other credible
2.3 Website Trust Features

The abundance of commercial websites makes it difficult for consumers to differentiate between sellers offering high quality products and sellers offering inferior products, or between legitimate and illegitimate sellers. Therefore, merchants have to establish a trusting relationship with potential customers to promote themselves as a reliable distribution channel. Trust is a crucial aspect of any dyadic (buyer-seller) relationship in which a trustor (buyer) cannot control the behavior of a trustee (seller) that in turn can lead to negative consequences of one party not complying with contractual requirements [18]. Jarvenpaa, Tractinsky and Vitale [14] define trust in an online store as the buyer’s readiness to put faith in the seller in a situation where the buyer is vulnerable to the seller.

Prior research has identified features that are used online to promote trust. They include third party verification seals [19], online reputation systems [20], social presence [21] and feedback mechanisms [22].

A study performed by Cheskin Research/Sapient [23] identified six fundamental features that convey trust online including brand name, ease of navigation, fulfillment, presentation, the use of the latest technology and verification seals. In the academic literature, Kim and Benbasat [24] through intensive literature review identified that trust in e-commerce is communicated via verification seals, brand and reputation, fulfillment (privacy and security policies and efficient communications with consumers), referrals, feedback and links to other reputable websites. Thus, websites with visible trust features are likely to influence buyers’ trust towards the seller and further encourage shopping activity.

3. Hypotheses Development

Based on signaling theory, we propose that online pharmacies will use both assessment signals and conventional signals through website trust feature manipulation. To increase the level of trustworthiness the seller may add or omit trust features that identify the seller and the website as trustworthy. We expect that regulated pharmacies that are accredited by official pharmaceutical agencies will rely more on assessment signals, while unregulated pharmacies that lack official endorsements will depend on conventional signals.

3.1 Assessment Signals

Assessment signals, although not impossible to forge, require some effort to be produced and are usually more costly than conventional signals [17]. In online pharmacies, assessment signals may include verification seals, store presence features and product selection features.

Verification seals are third-party seals that are provided by other companies that assure the safety of websites [23]. McKnight and Chervany [25] propose that verification seals increase trust, but the intensity of that trust depends on the nature of the seal. We identify three types of seals that can appear on online pharmacy websites. The first type consists of standard verification seals that work at the website level: examples include Verisign seals (www.verisign.com) that prove secure e-commerce transactions, TRUSTe seals (www.truste.com) that are given to online organizations supporting web privacy, and BBBOnline seals (www.bbb.org) that are granted to websites that follow ethical online business practices and are ready to resolve complaints using the Better Business Bureau dispute resolution program. The second type is merchant seals that include logos representing merchant service security such as American Express, MasterCard, and Visa for traditional payment services and PayPal or Google Checkout for electronic payment services. The third type of seal is domain specific. In the case of online pharmacies, special seals have been developed to support online pharmaceutical business. For example, VIPPS seals (www.nabp.net) confirm that a pharmacy is licensed and complies with regulations.

To be endorsed by a domain verification seal such as VIPPS, the pharmacy should qualify as a safe, ethical and secure business. Unregulated pharmacies usually do not possess qualities required to be approved by specialized pharmaceutical agencies. In addition, to earn this endorsement,
pharmacies have to pay a membership fee. As firms are likely to use the least expensive signals [11], click-and-mortar pharmacies (pharmacies with both physical and online facilities) with established brand names may find it unnecessary to invest into verification seals, while low quality sellers will use seals that do not require much effort to obtain. More formally:

**H1:** Regulated online pharmacies will use more verification seals than unregulated or click-and-mortar pharmacies.

*Store presence* refers to the ability of a website to convey longevity and stability. Fogg et al. [26] define store presence as a ‘real world feel’ and suggest that including complete contact details as well as pictures of company members on the website increases website credibility. Live chat contributes to the forming of trustworthiness as it demonstrates that real people work behind the virtual store representation. The availability of physical stores also contributes to trusting beliefs as it conveys prolonged existence of the stores. In addition, some online pharmacies employ a licensed pharmacist who is responsible for answering questions and providing recommendations to online customers, which contributes greatly to the real world feel.

Some store presence features such as physical stores and the availability of licensed pharmacist require a significant monetary investment. Live chat and the availability of contact information are less costly. However live chat assumes constant presence of a professional on duty, and contact information may reveal the real identity of a seller which low quality sellers often try to conceal. Therefore we expect:

**H2:** Unregulated online pharmacies will have fewer store presence features than click-and-mortar and regulated pharmacies.

*Product Selection:* According to a U.S. Food and Drug Administration investigation, consumers buy medicines online to avoid the hassle of getting a prescription [9]. Products offered by online pharmacies can be divided into two broad categories: over-the-counter medicines and prescription medicines. While legally operating pharmacies do not sell prescription medicines without verifying the prescription request with an appropriate health care provider [27], illegally operated pharmacies do not require such verification. Therefore, the availability of prescription medicines without any regulatory control signals that a pharmacy may be either operating without license or selling illegal medicines. 

**H3:** Unregulated online pharmacies will sell prescription medicines without prescription while regulated and click-and-mortar pharmacies will not.

### 3.2 Conventional Signals

Conventional signals are easy to produce as they do not require significant investment [17]. Unregulated pharmacies lack official endorsements and thus they will have to compensate with trust features that are easy and inexpensive to create. In this case, low quality sellers may use forged fulfillment policies and health content to make users believe that the website is trustworthy.

*Fulfillment* refers to the issues related to customer service [28] and includes mechanisms supporting information flow between the time of actual purchase and the time a product is received, as well as information regarding the security of transaction and information sharing. Main features of fulfillment include privacy policy, security policy, return policy and order tracking information. In addition, to comply with pharmacy regulations, legitimate pharmacies must include the HIPAA privacy statement on their websites to demonstrate that they protect the privacy of health information and provide individuals with certain rights with respect to their health information. In order to signal trustworthiness, unregulated pharmacies may falsify fulfillment features by providing bogus privacy, security and return policies that are not difficult to obtain by copying and pasting them from other online sources. By introducing these features unregulated pharmacies promote positive perceptions towards the website and reduce the uncertainty associated with the purchase.

**H4:** Unregulated online pharmacies have more instances of fulfillment features than click-and-mortar and regulated online pharmacies.

*Health content* is specific to the online pharmacy domain and provides useful information about medicine safety and the understanding of medicines and their interactions with each other. Huizingh [29] stresses the importance of specific product information availability as well as the accessibility of the information that is useful for consumers but not necessarily aimed to acquiring new orders. When ordering a new medication buyers may experience higher anxiety and uncertainty in regards to side effects and compatibility with other medications they are taking. In such situations, the richer health content provided by an online pharmacy leads to a better perception of the website. Pharmacies that plan to stay in business for a longer period of time may find it beneficial to invest in richer health content.
While regulated pharmacies may invest in their own original health content creation, low quality pharmacies may reduce the investment by copying and pasting existing content from other reputable websites and displaying it as their own.

H5: Unregulated online pharmacies have more instances of health content availability than regulated pharmacies.

4. Methodology

To address our research questions, we employ a qualitative approach based on the content analysis of existing pharmaceutical websites. Content analysis methodology has been widely used in analyzing website content. Ghose and Dou [30] examined the level of interactivity of websites. Bucy et al. [31] investigated the relationships between website traffic and page structure. Scharl and Bauer [32] analyzed the content of a site in terms of the number of images and external links. Benbunan-Fich and Altschuller [33] studied web presence transformations.

Our unit of data collection is a website that represents actual practices. This method has obvious advantages over surveys and interviews that provide subjective perceptions of such practices. Since content analysis does not rely on self-reported data, this methodology is not vulnerable to issues associated with self-reporting such as social desirability bias, recall bias, misunderstanding of questions, negative affectivity and common method variance.

Content analysis is a method used to code and analyze the content of communication [33]. According to Neuendorf [34], to perform a content analysis all variables, coding rules and measurements should be specified in advance. Employing a pre-defined analysis structure permits consistent collection of relevant data. Neuendorf [34] further mentions that in some content analysis situations, the unit of data collection is different from the unit of analysis. In our research, the unit of data collection is a website, and the unit of analysis is a website trust feature.

Overall, we identified 15 distinct variables that form five categories of website trust features (Table 1). Each variable in Table 1 denotes a categorical (0-1) descriptor. If the particular variable was present in the website it was coded as “1”, and if the variable was absent it was coded as “0”. The coding was conducted using only explicit content (the exact availability of the variable on the website). A coding template was developed to standardize the process.

All variables were identified from reviewing the existing literature in website trust and in the particular studies on online pharmacies. However, some general variables such as website content and design and brand name recognition were not included into our analysis due to the difficulty of standardizing their coding.

<table>
<thead>
<tr>
<th>Table 1. Variables and definitions</th>
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4.1 Sample

In the United States, online pharmacies are certified by the National Association of Boards of Pharmacy (NABP). This body developed the Verified Internet Pharmacy Practice Sites (VIPPS) accreditation program that provides verification seals to pharmacies that comply with state and federal regulations and meet the terms of VIPPS criteria for privacy, authentication and security (http://vipps.nabp.net/verify.asp). As of May of 2009, NABP provides on their website (www.nabp.net) a list of 16 accredited and 1873 not recommended online pharmacies. This board acknowledges the possibility that some non-accredited pharmacies may be operating legitimately and that there are other entities that approve non-accredited internet pharmacies. From these alternative accreditation bodies the only one that follows the standards established by NABP is LegitScript (www.legitscript.com), which has a database of
thousands of online pharmacies, with only 254 that meet the standards and 745 candidates for approval, as of May of 2009.

Based on the methodology used by Benbunan-Fich and Altschuller [33], we compiled a list of online pharmacies and organized them into three categories: regulated, click-and-mortar and unregulated. The first group consists of VIPPS and LegitScript accredited websites. The second group was randomly chosen from the list of top-100 click-and-mortar pharmacies selected from the Chain Drug Review by Pharmacy Count [35]. The third group was randomly chosen from the list of not recommended websites published by NABP. Each group consists of 30 independent websites; the complete sample includes 90 websites (30 in each category).

Our goal is to examine how regulated online pharmacies differ from their click-and-mortar and unregulated counterparts in terms of website trust features. To this end, the website pages were coded based on the features proposed in Table 1.

5. Results

5.1 Inter-coder Reliability

Two independent coders analyzed the sample of online pharmacies. The inter-coder reliability, computed as the percent of agreement obtained for all variables, ranges from 75% to 93%, showing a high level of reliability for all variables. Coding disagreements were adjudicated by discussion and consensus.

5.2 Hypotheses Testing

In order to identify categories of website trust features that are significantly different among three distinct groups of pharmacies, a Kruskal-Wallis test followed by Mann-Whitney test was conducted on the mean scores of the fifteen identified website trust features. Table 2 shows mean ranks for assessment and conventional features as well as mean ranks of the fifteen website trust features grouped into five categories: fulfillment, verification seals, store presence, health content and prescription. Figure 1 plots the graph for the mean scores of website features among three pharmacy groups.

Non-parametric tests such as Kruskal-Wallis are helpful for determining whether or not the values of an ordinal variable differ between two or more groups. The Kruskal-Wallis test employs ranks of the original values and not the values themselves which is appropriate when variables are dichotomous and represented with a 0-1 descriptor. While Kruskal-Wallis tests indicate when groups are different, it does not provide information to determine how the groups differ from each other. Thus, we use a Mann-Whitney test for pairwise comparisons to further compare differences between groups.

To test our assumption that regulated pharmacies will use more assessment features than unregulated pharmacies, a Kruskal-Wallis test was conducted ($\chi^2=26.424$, df=2, p<0.01). To further compare differences between regulated and unregulated pharmacies, a Mann-Whitney test was conducted (Z= -2.471, p<0.05) that shows that there is a significant difference in the usage of assessment features. Regulated pharmacies use more assessment features (Kruskal-Wallis mean= 60.45), while unregulated pharmacies use fewer assessment features (Kruskal-Wallis mean= 28.40).

<table>
<thead>
<tr>
<th>Features</th>
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<tr>
<td>All Trust Features</td>
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<td></td>
<td>Click-and-mortar</td>
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<td></td>
<td>Unregulated</td>
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<tr>
<td>Assessment Features</td>
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</tr>
<tr>
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<td>Click-and-mortar</td>
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<td>28.40</td>
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<tr>
<td>Conventional Features</td>
<td>Regulated</td>
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<tr>
<td></td>
<td>Click-and-mortar</td>
<td>39.75</td>
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<td></td>
<td>Unregulated</td>
<td>49.67</td>
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<tr>
<td>Verification Seals</td>
<td>Regulated</td>
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<tr>
<td></td>
<td>Click-and-mortar</td>
<td>26.70</td>
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<td></td>
<td>Unregulated</td>
<td>56.73</td>
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<tr>
<td>Presence Trust Features</td>
<td>Regulated</td>
<td>51.20</td>
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<td></td>
<td>Click-and-mortar</td>
<td>62.50</td>
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<td></td>
<td>Unregulated</td>
<td>22.80</td>
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<tr>
<td>Prescription requirement</td>
<td>Regulated</td>
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<td>Health Content Features</td>
<td>Regulated</td>
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</tr>
<tr>
<td></td>
<td>Click-and-mortar</td>
<td>50.50</td>
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<tr>
<td></td>
<td>Unregulated</td>
<td>37.00</td>
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</table>
The first hypothesis stating that regulated online pharmacies use more verification seals than unregulated or click-and-mortar pharmacies is partially supported. Regulated pharmacies use more verification seals than their click-and-mortar counterparts (Kruskal-Wallis means 53.07 for regulated and 26.70 for click-and-mortar pharmacies, \( \chi^2=27.606, \text{ df}=2, \ p<0.05 \)), and almost the same number of seals as unregulated pharmacies (Kruskal-Wallis means 53.07 for regulated and 56.73 for unregulated; Mann-Whitney, \( Z=-0.751; \ p>0.05 \)).

To further test differences between regulated and unregulated pharmacies, we examined each type of verification seal separately. The findings show that unregulated pharmacies use more third-party seals than regulated pharmacies (Mann-Whitney means 26.50 for regulated and 34.50 for unregulated pharmacies, \( Z=-2.053, \ p<0.05 \)). Unregulated pharmacies also have more instances of credit merchant seals (Mann-Whitney means 22 for regulated and 39 for unregulated pharmacies, \( Z=-4.476, \ p<0.05 \)). However, regulated pharmacies have more instances of domain specific seals (Mann-Whitney means 39 for regulated and 22 for unregulated pharmacies, \( Z=-4.8, \ p<0.05 \)). The overall usage of verification seals by three types of pharmacies is shown in Figure 2.

Regarding hypothesis 2, click-and-mortar pharmacies have the most store presence features (Kruskal-Wallis, mean=62.50), while regulated pharmacies have fewer store presence features (Kruskal-Wallis, mean=51.20) and unregulated pharmacies have the fewest (Kruskal-Wallis, mean=22.80). To further compare store presence features of regulated and unregulated pharmacies, a Mann-Whitney test was conducted (\( Z=-4.754, \ p<0.05 \)). Therefore H2 is supported.

With respect to hypothesis 3, regulated pharmacies and click-and-mortar pharmacies do not sell medicines without prescription (Kruskal-Wallis means 59.50 for regulated and 58.00 for click-and-mortar, \( \chi^2=72.082, \text{ df}=2, \ p<0.05 \)), unregulated pharmacies, on the other hand, most often sell prescription medicines without prescription (Kruskal-Wallis mean=19.00, \( \chi^2=72.082, \text{ df}=2, \ p<0.05 \)). Thus, H3 is supported.

To test our premise that unregulated pharmacies use more conventional features than regulated pharmacies, we performed a Kruskal-Wallis test and found no difference between these two groups of pharmacies (\( \chi^2=2.499, \text{ df}=2, \ p>0.05 \)). Therefore, our premise is not supported and both regulated and unregulated pharmacies use approximately the same number of conventional features (Kruskal-Wallis means 47.08 and 49.67 in groups 1 and 3 respectively).

To test hypotheses 4 and 5, we closely examined fulfillment and health content features. Our findings partially support H4. Unregulated pharmacies have more fulfillment features than click-and-mortar pharmacies (Kruskal-Wallis means 54.25 for regulated and 36.53 for click-and-mortar, \( \chi^2=7.458, \text{ df}=2, \ p<0.05 \)). To compare the difference between regulated and unregulated pharmacies, a Mann-
Whitney test was conducted (Mann-Whitney, Z= -1.22, p<0.05). This test shows there is no statistical difference between regulated and unregulated pharmacies in terms of fulfillment features.

Regulated pharmacies and click-and-mortar pharmacies have almost the same number of health content availability (Kruskal-Wallis means=49.00 for regulated and 50.50 for click-and-mortar), while unregulated pharmacies have fewer instances of health content usage (Kruskal-Wallis means=37.00, χ²=7.001, df=2, p<0.05). A Mann-Whitney test confirmed that the observed differences are highly significant (Mann-Whitney, Z= -2.235, p<0.05). These results are in the opposite direction to H5. Therefore, H5 is not supported.

Table 3 shows the results of hypotheses testing.

<table>
<thead>
<tr>
<th>H#</th>
<th>Hypothesis Supported</th>
<th>Kruskal-Wallis χ²</th>
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<th>Mean Rank Click Mortar</th>
<th>Mean Rank Unregulated</th>
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<td>H1</td>
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<td>27.60</td>
<td>53.07</td>
<td>26.70</td>
<td>56.73</td>
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<td>H2</td>
<td>Supported</td>
<td>44.00</td>
<td>51.20</td>
<td>62.50</td>
<td>22.80</td>
</tr>
<tr>
<td>H3</td>
<td>Supported</td>
<td>72.08</td>
<td>59.50</td>
<td>58.00</td>
<td>19.00</td>
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<tr>
<td>H4</td>
<td>Partially supported</td>
<td>7.458</td>
<td>45.72</td>
<td>36.53</td>
<td>54.25</td>
</tr>
<tr>
<td>H5</td>
<td>Not supported</td>
<td>7.001</td>
<td>49.00</td>
<td>50.50</td>
<td>37.00</td>
</tr>
</tbody>
</table>

6. Discussion

Our results are consistent with the signaling theory stating that assessment signals are difficult to forge while conventional signals are easy to produce. Examining samples of regulated and unregulated websites, we found that there is a significant difference between regulated and unregulated pharmacies in terms of assessment trust features. Although both regulated and unregulated pharmacies use approximately the same number of verification seals, the nature of the seals is different. Regulated pharmacies rely more on hard-to-obtain domain specific seals, while unregulated pharmacies depend on the logos of well-known credit card merchants such as Master Card, American Express, and Visa. While the logos of credit card merchants are often found on unregulated websites, the logos of electronic merchants such as Google Checkout or PayPal have not been used by unregulated pharmacies; this leads us to believe that Google Checkout and PayPal belong to a category of hard-to-obtain assessment verification seals.

Store presence features are equally important in identifying an unregulated pharmacy. As the majority of store presence features come at great cost, unregulated pharmacies shy away from using these features on their websites.

The most significant difference we found was in the product selection category. Unregulated websites create a competitive advantage over regulated websites by offering a wide selection of prescription drugs without the prescription. Therefore, the availability of prescription drugs without any formal control can serve as an important signal of possible illegitimacy of online pharmacies.

In terms of conventional website trust features, both regulated and unregulated pharmacies scored the same. Unregulated pharmacies use the same number of fulfillment and health content features to attract potential buyers. One of the interesting findings in the fulfillment category is that regulated pharmacies usually do not provide product tracking information, while unregulated pharmacies do provide this feature for an additional fee that sometimes exceeds the actual cost of the medicines they sell. Another difference is that regulated pharmacies have a higher occurrence of using the HIPAA privacy notice than unregulated pharmacies.

For the purpose of control we also tested navigation features (broken links) and the availability of consumer feedback for all three groups of pharmacies. However, no statistical difference has been found.

Non-parametric analyses of the coded variables enabled us to identify a website profile of regulated pharmacies and compare it to the profile of unregulated pharmacies. Based on our findings, a typical regulated pharmacy has on average 7.7 website trust features and most often employs domain specific verification seals, the HIPAA policy, privacy and security policies, contact details, and will never sell a prescription drug without prescription.

In contrast, unregulated pharmacies have 5.5 website trust features on average. Their profile includes logos of credit merchants, description of fulfillment features, and lack of store presence features. In addition, prescription medicines are easily obtainable through unregulated pharmacies. A typical unregulated pharmacy does not provide a HIPAA privacy statement, although a generic privacy statement is usually available.

For control purposes, websites of click-and-mortar pharmacies have an average of 6.8 website trust features and do not rely on verification seals but provides an abundance of health content and store presence features such as contact details, physical stores and store addresses.
Based on the nature of the website trust features used, our findings suggest that regulated online pharmacies tend to use more assessment trust features than unregulated online pharmacies. However, the usage of conventional trust features is not different between these two groups.

Derived from the results of this study, we recommend that pharmacy users pay attention to the following website features while evaluating the trustworthiness and credibility of pharmacies: VIPPS logo that can be verified on the VIPPS website, the availability of alternative methods of payment such as Google Checkout and PayPal, HIPAA privacy notice, privacy and security policies and the availability of contact information that corresponds to a real physical address. An address can be further verified through the usage of major search engines.

Our results are also noteworthy for credit card companies. The ease that unregulated pharmacies employ in using credit card merchant logos on their websites suggests that these service providers should carefully investigate websites for unauthorized logo usage. If credit merchants are able to make their logos serve as assessment signals which are difficult to falsify, unregulated pharmacies may have less success in signaling trust.

A potential limitation of this research is the coverage of the sampling frame. Although we compiled an initial list of pharmacies from different online directories, it is difficult to ensure that such a list is complete. The group of pharmacies for content analysis was randomly chosen from this sampling frame. Due to the sample size, we used non-parametric analysis. Our results are also limited by the nature of the website features we examine and the dichotomous coding of such features. Nevertheless, the novelty of the context and the nature of the analysis enable us to produce specific recommendations for online consumers and regulatory bodies. This research also advances our understanding of the signaling theory and provides a comparative analysis of website trust features across various types of online pharmacies.

7. Conclusion

In this research, we examine the nature and role of website trust features as a means for signaling trust by online pharmacies. An awareness of these features is helpful in differentiating between regulated and unregulated pharmacies. The knowledge of signals implemented with technology solutions, and savvy consumers attentive to these signals, help address one of the existing challenges for the continued development of online marketplaces. Our findings indicate that regulated online pharmacies tend to use more assessment trust features than unregulated online pharmacies, while the usage of conventional trust features is the same across both groups.

We hope these findings will help enable online buyers to choose an online pharmacy wisely and to act responsibly and effectively by making good decisions based on signals that online pharmacies send. While these differences may be obvious for a savvy online buyer, whose level of internet competency and technology sophistication is high, the knowledge of these differences for a less experienced buyer may not be so clear, and an awareness of them is crucial. This information might also be useful for regulatory institutions in their quest to educate online consumers and evaluate online pharmacies.

8. References


