**Introduction**

The Dark Internet is a subset of the World Wide Web only accessible with specific software, such as .onion sites and the Tor browser. This enables complete browser identity protection, leading to private transactions by people seeking to avoid observance by governments or major corporations (Brightplanet, 2012). Current research of the culture of the Dark Internet is limited, since most existing research focuses on the structure of the Dark Internet itself. Team DIRE, however, plans to analyze crisis events relating to the Dark Internet and the substituent community response, the culture of the Dark Internet community, and bitcoin’s use as a form of currency in Dark Internet marketplaces. Team DIRE has divided our methodology into three sections corresponding to these research goals, and will analyze each of the methodologies for these sections in detail.

**Methodology**

**Aim 1: Key Events and Crises Responses.**

**Research Question and Hypothesis.** The communication of a community during and after crises can provide insight into the culture of the people immersed in that community. In order to understand the culture found on Dark Internet marketplaces, Team DIRE plans to study the communication among individuals within the Dark Internet community during crisis events, such as the shutdown of a major marketplace. Our goal is to answer the following question: How does the communities response to crisis events reflect the underlying culture? We hypothesize that, although members of the Dark Internet are anonymous, crisis events will bring the community together and give a representation of the Dark Internet’s culture that is different from the day to day.

**Data Collection.** In order to analyze the communication among individuals immersed into the culture of Dark Internet marketplaces, we will need to consistently gather text samples from various sources to establish a communication baseline before specifically analyzing the culture’s communication methods during and after crises. We will set out to collect text samples from a variety of sources in order to try to capture an accurate view of the population of Dark Internet marketplaces. We will gather these samples from both Dark Internet and traditional Internet online discussion boards and forums devoted to Dark Internet marketplaces. We will collect text samples from time periods surrounding key events that we identify as well as also collecting samples from any key events that should occur during sample collection (i.e. should another government shutdown of a major market occur). Text samples will consist of screen shots of forum discussions during the time of the event.

Outside of collecting text samples to be analyzed, we have evaluated events involving the Dark Internet marketplaces to create a list of major events; these events are the context around which we are collecting samples and conducting our analyses. We have currently constructed a timeline for major events and Team DIRE plans to review the history of the online forums and discussion boards that we identify to additionally gather samples from past major events for analysis.

**Data Analysis.** We will be analyzing our data using methods similar to other crisis communication studies. We will do this by first coding the samples we collected. In a study on the use of blogs as crisis communication during Hurricane Katrina, Macias, e.t al. analized hundreds of different blog posts from the two weeks following the landfall of Hurricane Katrina. They then counted and categorized the number of times a blog post was used for a predefined function, such as if the blog post was a call for rescue or an official news post. One thing in particular that stood out about this methodology was how they classified the information; sorting it into overarching concepts in addition to determining the frequency. We can adapt this to our use by first determining what functions we will be searching through the texts for. Once that is decided on, we will read through the texts and classify each post based off of its function. We will likely use several team members to code the texts to better normalize the categorization of each post. After coding the texts for each crisis event, we will be able to determine what functions are relied on during times of crisis and if those functions change from crisis to crisis.

**Anticipated Results.** Based on previous studies done on other culture communication and the information we have thus far gathered on the culture of the Dark Internet, we predict that we should be able to observe a difference between communication patterns during and after times of normalcy versus times of crises or key events. By observing these patterns over several key events within the Dark Internet’s history, we hope to find connections between the communities’ responses over several similar events. Through this, we should be able to better understand and analyze the response to future events.

**Limitations on data collected.** Dealing with current events provide their own set of problems to researchers, and our situation is no different. One issue we might run into is an event that is still playing out as we are beginning our analysis. To produce the most up to date research, we will try to gather the most current data on the events we are analysing. As such, we will need to be flexible with our analysis, able to add new information about key events as they develop. Additionally, as these events unfold, our sources reporting misinformation is a possibility. As in the case of Sunil Tripath, a misreport can cause massive waves within the community, which could be beneficial so long as we are able to recognize the false information and not interpret the response as fact (Kang).

**Aim 2: Cultural Themes.**

**Research Question and Hypothesis.** Communication and culture are linked in such a way that one cannot be understood without the other. Communication provides the guidelines to learning what behaviors are appropriate in a specific society (Jandt, 2015). Therefore, in order for a culture to uphold its beliefs, it needs a channel to communicate through . The channel through which communication is achieved can reflect upon the character of the culture. Focusing on the Tor network as a society, we can form conclusions about the society’s culture through user communication (Jandt, 2015). Also, in order to understand a culture’s reaction to events and crises it is important to first understand the ongoing everyday day culture (Kiesler, 2014). Within any given society, there will be at least two subcultures with similarities and differences in how they behave and interact (Peppas, 2001). As we have grouped users of the Tor Network as a society of its own, we anticipate that several distinct cultures may arise by observance of users’ behaviors and language. As we analyze the content of respective forums, we hope to learn more about faithful users of these marketplaces and the vast drug underground culture that is involved. We seek to gain valuable research on topics such as the operation and ideals of these sites.

Our goal is to answer the following question: what cultural themes are present and how do their expressions affect the dynamics of the Dark Internet? We hypothesize that the increased levels of anonymity provided by the Dark Internet allow users freedom from repercussion; therefore users will more likely display anti-normative behaviors in contrary to the powers that be than users of message boards over the public Internet.

**Data Collection.** Websites that are accessed through both the Dark and conventional Internet fall under the following three varying levels of anonymity: (1) identifiable, (2) pseudo-identifiable, and (3) non-identifiable. In an (1) identifiable level of anonymity, a user’s name is linked with the account in connection with personal information (i.e. Facebook). In a (2) pseudo-identifiable level of anonymity, a username is used. They are identifiable by this self-made tag, but there is no connection to personal information (i.e. Reddit). Finally, in a (3) non-identifiable level of anonymity, the site does not require users to use any form of identification.

We will first identify six sites to study by using the previously stated levels of anonymity. Three sites will be taken from the conventional Internet and three sites will be exclusively for the Tor Network (.onion sites). Additionally, all six sites will have to meet the following requirements: contains a blog or consistent posting of articles, topics must discuss controversial political topics (i.e. abortion, terrorism, current events), and allow for users to leave comments.

**Data Analysis.** There will be a total of 72 samples of data (12 pieces of text from each of the six sites). Then, by following coding system developed by Boykin, Tyler and Miller (2005), we will code the language used in the text. The coding system will categorize the dynamics involving the cultural themes and behaviors of the users of the Dark and conventional Internet. There are ten types of behaviors that are assumed to be present on the Internet: movement expressiveness, verve, affect, orality, communalism, individualism, competition, object orientation, priority placed on cognition over the display of affective expression, and maintenance of a bureaucracy orientation (Boykin, Tyler, & Miller, 2005).

The first cultural themes used to code the language, movement expressiveness in terms of the Dark Internet, appears in the form of rhythm through speech patterns (Boykin, Tyler, & Miller, 2005). Verve refers to the receptiveness to high levels of stimulus meaning Dark Internet users’ focus on and reaction to events, such as a market shutdown, and the affect cultural theme relates to the emotional response to such events (Boykin, Tyler, & Miller, 2005). Orality manifests in knowledge gained and passed on through word of mouth (Boykin, Tyler, & Miller, 2005). Communalism relates to the feeling of duty towards the Dark Internet community, while individualism refers to the feeling of autonomy by the user (Boykin, Tyler, & Miller, 2005). Competition has to do with a person’s need to do better than their peers (Boykin, Tyler, & Miller, 2005). Object orientation involves the feeling of positivity in response to objects which evolves into an individual's association of self value with material possessions (Boykin, Tyler, & Miller, 2005). Priority placed on cognition over the display of affective expression is in contrast to the cultural theme of affect, it refers to an objective and rational reaction to events (Boykin, Tyler, & Miller, 2005). Bureaucracy orientation relates to a focus on structure and rules with an impersonal approach to relationships and events (Boykin, Tyler, & Miller, 2005).

**Anticipated Results.** We anticipate that the language used in each of the varying levels of anonymity will reveal behaviors and themes that are prevalent to distinct cultures within the Dark Internet. For example, we seek to relate anonymity and the interactions of users to how it correlates to the speech and communication of its users. We anticipate the the anonymity of the Tor Network allows users to freely express themselves without being censored and the shadow of being monitored by the government. We anticipate correlation between behaviors such as individualism and the priority placed on cognition over the display of affective expression with anonymity on the Dark Internet.

**Aim 3: Marketplace/Bitcoin Comparison and Experience.**

**Research Question And Hypothesis.** Our team will be attempting to answer the following research question: to what extent does Bitcoin affect Dark Internet online transactions and how does it compare to the traditional buying and selling of goods? We hypothesize that using a bitcoin on the Dark Internet will show many similarities to the use of conventional currencies in traditional online transactions. However, we hypothesize that there will be distinct differences unique to the bitcoin, as it is by nature inherently different from standard forms of currency due to its nearly untraceable nature. Bitcoin is not backed by any legal institution, is an entirely digital currency which can only be stored on electronic media, and relies on peer-to-peer networking and cryptography to maintain its integrity (Brito et al., 2013) (Barber et al, 2012). A longitudinal study of Silk Road transactions found that the bulk of all exchange trades were speculative, and thus Bitcoin was used as a commodity rather than a currency (Christin, 2013). Understanding these distinct differences and experiencing them firsthand will show how Bitcoin greatly affects transactions on the Dark Internet.

**Sample Information.** In order to acquire information pertaining to our research question and hypothesis, as a team we will purchase enough bitcoin as necessary, which we will use for transactions on the Dark Internet. State Grants or any other source of State funding cannot be used to purchase a bitcoin, so our team acquired funds to purchase the bitcoin by our own means. To accomplish this, we relied on an online crowdfunding campaign as well as a food sale held on the University of Maryland campus. These campaigns have provided us with sufficient funds to purchase a bitcoin for research purposes.

Once we purchase this bitcoin(s), we will use it to help accomplish our research goals. This will be done by purchasing the services of four separate ghostwriters, two from the Dark Internet, and two from the public Internet, who will be hired to write academic papers for us. We will also use conventional currency to hire two additional ghostwriters from the public Internet. For a control group, we will also collaboratively write an academic paper ourselves, using the same prompt we give to the ghostwriters. Once we have received our papers, we will be able to compare them using methods described below, to assess the quality of the products obtained through different services and methods of payments. We have chosen to purchase an academic paper through ghostwriting service because it is available over both the public and dark internet, the quality of the product can be directly assessed, and it is not illegal to purchase.

**Data Collection.** In order to actually purchase the bitcoin(s), there are many different sites that we can use to make the purchase, such as Coinbase or bitcoin.com. Different online markets, both on the Dark Internet and public Internet, allow for the purchase of a bitcoin, or fractions of a bitcoin. The purchasing of a bitcoin is very similar to setting up a traditional bank account; an initial sum of money is deposited, and this money can then be used at any time for a variety of purposes. We can also sell our bitcoin(s) back to many of these sites to receive payment in USD in return. During the time that we possess this bitcoin,it will be contained in a digital “wallet” installed on a teammate’s computer, ensuring that we will be the only ones with access to this bitcoin.

Because the value of a bitcoin constantly fluctuates, it is very possible that at the end of our project our bitcoin(s) will not be worth as much as it was when we first purchased it. We must be prepared to lose a fraction of the money we have fundraised, due to the volatile nature of the currency. As for where we will make this purchase, we have several options available. Numerous sites accept bitcoin, including Newegg and PayPal, but for the intents and purposes of our project we will use a popular Dark Internet market, such as Middle Earth or Aphraxas.

Our current plan for the usage of this bitcoin is to aid in our analysis of the way transactions are conducted on the Dark Internet and clearnet. Market sites such as eBay and Amazon have become household names by establishing reputations as companies that provide reliable and high quality service. Success on Dark Internet marketplaces is achieved in a similar manner: maintaining a high reputation for good business. However, one major differing factor is the Dark Internet’s much higher capability for anonymity, provided through tools such as bitcoin. The initial trust that always exists in a legal, regulated setting, like a brick-and-mortar store or commercial website, is not guaranteed for those who wish to conduct transactions on the Dark Internet. This variance in market regulation may have significant effects on the development of markets on the Dark Internet.

In our analysis of these effects, there are several confounding variables that we may encounter and will have to work through. Primarily, it is possible that the amount of money we have fundraised will not be sufficient enough to purchase a significant amount of bitcoin. Ideally, this would not occur, but in the event of having insufficient funds, our team would need to seek other methods of collecting money, likely through obtaining a private grant, or performing another online crowdfunding campaign or food sale. Secondly, many of the markets on the Dark Internet have been seized and shut down by the federal government in the past (In Brief, 2014). The instability characterized by these markets due to their illegal nature complicates the buying and selling process; therefore our team must determine the most stable online market available on the Dark Internet suitable for fulfilling our goals of acting as consumers on the Dark Internet and spending bitcoin. Even still, in the event that our chosen market is taken down, we must be prepared to salvage our data and find a new site. Last, although unlikely, it is possible that we will not be able to find a reliable writer on our chosen Dark Internet market. If this happens, we can either seek out writers on other markets or choose another legal product to purchase.

**Data Analysis.** Throughout the whole process of buying and keeping track of the value of our bitcoin, we hope to gain insight into the process of buying and owning bitcoin and being a consumer on Dark Internet markets. Excluding the beginning and final value of the bitcoin at the time of purchase and use, there will be no numerical data to gather. Rather, the data collected and analyzed will be completely qualitative with respect to the experience of purchasing and using a bitcoin, and the final deliverable we will receive from the ghostwriting servicesUsing bitcoin for purchases on Dark Internet markets will also allow us to gain a better understanding of the overall purchasing process on these markets.

This first-hand experience and the familiarity that this experience will grant us will best enable us to gain a better grasp of using bitcoin and acting as a consumer on the Dark Internet. This is important to study and understand because Bitcoin (and other cryptocurrencies) is a new, and possibly revolutionary, mechanism for payment. Bitcoin, unlike other forms of recognized payment, is not backed by any major bank or other financial institution, which forces sellers and consumers to have a certain level of trust when utilizing Bitcoin (Angel and McCabe, 2015). To be able to understand and qualify the concept of using an anonymous currency is important for informing people and society as whole who do not have faith in using this form of currency.

Our team will further our analyses of the experience by enlisting a ghostwriter to perform the same task from a comparable service on the public Internet, such as Academic Ghostwriting, and comparing the experiences and quality of the purchased services. All six ghostwriters will be asked to write five-page papers based on the same prompt and provided grading rubric, which we will receive from the Graduate Record Examinations website, which provides prompts that are free for public access and use. We will analyze the papers we purchase using the textual analysis techniques described on pages 2 and 3 of this paper. Additionally, we will enlist professionals from the University of Maryland English Department to grade these papers, and determine their validity, quality, and integrity as pieces of academic literature, as if they were written by actual University of Maryland students. To prevent bias, these professionals will not be informed as to where these papers came from, and will be led to believe that some of the papers were written by actual students. Each professional will receive three papers to grade. They will be aware that some of the papers were written by ghostwriters, but will not know which papers were written by Dark Internet ghostwriters, conventional Internet ghostwriters, or the fictitious students, as though the papers they received to grade were selected at random. In addition, we will evaluate the papers ourselves in terms of several variables regarding the consumer experience, including response time, communication with the authors, price, quality of the product, and ease of transaction. These observations will provide us with variables to compare in order to make conclusions regarding the overall quality of the services we had purchased through the Dark Internet and public Internet, and contribute to our understanding of the differences in user experience as customers ourselves. Gaining experience and insight on the process of using Bitcoin will help us to better understand why it is such a large part of the culture on the Dark Internet.

**Anticipated Results.** Bitcoin is a currency almost unlike any other on Earth; its backers claim that it offers perfect anonymity for those who purchase with it, which makes it a natural fit for most of the Dark Internet’s users (Levin et al., 2014). As of 2016, however, it remains a fringe currency at best, and many of its detractors point to its the murkiness and unreliability of bitcoin-backed purchases (Levin et al., 2014). In 2014, numerous events occurred both online and offline that reduced confidence in the currency. Mt. Gox, the premier exchange that handled 70% of all bitcoin transactions, suspended trading and began liquidation proceedings. The site announced that $450 million in bitcoin was missing and likely stolen. Since 2014, less than half of the bitcoins have been recovered, with the origin of the disappearance unknown. After reaching a peak value in November 2013 of US $1,242, the value of bitcoin plunged in 2014 to prices less than half of the previous year. A scholarly analysis of the reliability of bitcoin purchases on the most anarchic section of the Dark Internet - a place where there are theoretically *no* authorities and few ways of rendering merchants accountable - would greatly help our analysis of the benefits and drawbacks of online anonymity. The overall report could very well predict whether in the future, official and natural currencies will begin to emphasize anonymity as the public grows increasingly determined to protect its privacy and increasingly knowledgeable about how the Internet might help them.

**Limitations to data collected.** Team DIRE aims to gather data on various aspects of the Dark Internet, however our methods of data collection will not be without their problems. The data we will be collecting for the analysis of the Dark Internet will have its limitations based on the amount of time we have available to collect the data, as we may divide our time into studying several different online forums, rather than implementing a data collection software on one in particular. Our marketplace analysis will be limited based on the amount of data collected by the software we use, how we choose to have the software analyze the data, and where we choose to pull our data from. If we choose only certain forums to analyze with our software, we run the risk of missing information. Analysis of bitcoin and the consumer experience on the Dark Internet is limited to our team only experiencing the purchase of one type of item from the Dark Internet. Unfortunately, due to the time limitations of the span of the Gemstone Program, our team is unable to conduct an effective longitudinal study of the fluctuations in bitcoin value, despite the valuable information such a study would provide, and the lack of need of our team to purchase a bitcoin at all to do so. As it is impractical, as well as illegal in certain cases, to try to purchase a variety of productsfrom a Dark Internet market, we will be missing data on the consumer experience of those products and will only be able to speak to our experience in hiring a ghostwriter as well as the quality to the product provided.

**Conclusion.** Team DIRE’s research will delve into the relatively unexplored topic of the Dark Internet and the cultural phenomena surrounding it with the purpose of demonstrating its uses and functionality, the resulting impacts of current events on these, as well as its practicality as a source of economic trading processes through the use of anonymous online markets and Bitcoin. Our team will undertake a methodology comprised of researching three principal categories: Dark Internet Responses to Key Events, Dark Internet Marketplaces, and Bitcoin and Consumer Experience Analysis. These methods will allow our team to gather and analyze both qualitative and quantitative data surrounding the Dark Internet in order to explore its cultural and economic developments. Team DIRE will organize into several sub-groups and be assigned to different tasks under the methods described in our three chief areas of research, which will allow our team to accomplish our goals within the scope of our research program.

The Dark Internet has become an increasingly publicized topic in the mainstream media; Team DIRE believes that by working as an organized force to explore the subject in depth, opportunities for the sociocultural developments and economic advancements provided by the Dark Internet can be identified and exploited for public use.

**Limitations.** Our team will need to address various limitations of our research methods in order to be prepared for possible shortcomings that we may experience as we continue to conduct our research. For example, our utilization of textual analysis could present room for bias as data would be collected qualitatively, and thus some of our observed patterns might be altered as some users might for whatever reason modify their answers to our qualitative questions.

Qualitative data is by nature more open to interpretation, and thus our team must be prepared to analyze this data through a variety of perspectives in order to more accurately determine the meaning and significance of the data collected, and not simply attribute observed behaviors and attitudes to obvious interpretive measures that would not lead us to reaching valuable conclusions and insightful findings.

Another limitation of our research is that we have experienced multiple Dark marketplace shutdowns by the federal government, which are likely to occur again in the future. These shutdowns have inhibited our ability to focus on one particular Dark market site, and has forced us to maintain a certain level of flexibility by studying a wider range of marketplaces to ensure that we maintain a sufficient collection of information available to us even if a marketplace were to shut down, as this occurs relatively frequently. Rather than simply throwing out old data collected on marketplaces that have shut down, our team must be predisposed to observe these shutdowns as they occur in order to gain a practical understanding of the reaction of the Dark Internet community with regards to the shutdowns, and adapt to the change this signifies for Dark Internet markets. This will allow us to observe and analyze the shutdowns in real time rather than attempt to explore them as past events as we have already done. The reactions to the various shutdowns and crises the Dark Internet has experienced in recent years have provided useful insight as to the community’s attachment to the Dark Internet and commitment to its continued anonymity and protection.

In order to properly participate in research on the Dark Internet, Team DIRE will need access to the necessary funds to support our research. However, obtaining these funds will come with limitations. Primarily, state funds cannot be used to purchase bitcoins or other items on the Dark Internet. Therefore, funding for our research has been obtained by using a third party crowdfunding site, and the money we raised has been stored in a personal bank account until such time as it is needed. When we were initially searching for sites to use for fundraising, we had trouble finding sites that support the use of funds to purchase cryptocurrencies. Fortunately, we were able to find a site that suits our needs. **Conclusion.** Team DIRE’s research will delve into the relatively unexplored topic of the Dark Internet and the intricacies of its internal marketplaces with the purpose of demonstrating its functionality, the culture of the Dark Internet compared to other forms of online communication with variable levels of anonymity, as well as its practicality as a source of economic trading processes through the use of anonymous online markets and Bitcoin. Our team will undertake a methodology comprised of researching two principal categories: Dark Internet Internal Communication, and Dark Internet Marketplaces and Consumer Experience. These methods will allow our team to gather and analyze both qualitative and quantitative surrounding the Dark Internet in order to explore its cultural and economic developments.

Team DIRE will organize into several sub-groups and be assigned to different tasks under the methods described in our two chief areas of research, which will allow our team to accomplish our goals within the scope of our research program. The Dark Internet has become an increasingly publicized topic in the mainstream media while still lacking meaningful research on the subject; Team DIRE believes that by being among the first to work as an organized force to explore the subject in depth, opportunities for the cultural developments and economic advancements provided by the Dark Internet can be identified and exploited for public use.