Corporate Control? Measuring Private Sector Censorship of Social Media

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Abstract

Censoring activities on sensitive topics have played a significant role on social network sites (SNSs). Owing to the difference in politics, economics and cultures in the various countries, many social network sites including Facebook, Twitter, Google, Reddit and Imgur might implement different censorship standards according to the situation of the country. This study aims to explore whether governments' decision and censorship policies mentioned in previous studies have been implemented on main social network sites. Additionally, this article searches a list of sensitive keywords on each tested site, which is also the simplest approach applied to explore censorship on social network sites regulated using keywords filtering. Indeed, classifying a list of keywords into blacklist or merely blocking some defined sensitive topics refers to the primary method for censoring information on social network sites. The discussion makes us re-examine not only censorship on social network sites but also propose three possible conclusions concerning censorship on social network sites in specific country, such as 'censorship is weaker than we anticipated', 'some social network sites focus on supporting country's censorship' and 'censorship is imperfect to be implemented by social network sites'. As shown by results, some leaks still exist on current censorship of social network sites, while some sites fail to sensor harmful information that should be blocked. However, some harmless information is blocked by certain sites that may influence users' browse information. By analyzing the censorship data of blocked keywords and pornography sites on Facebook, Twitter, Google, Reddit and Imgur, this research highlights the defect of censorship implemented on social network sites.

Keywords: censorship standards, social network sites, censoring

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Chapter 1: Introduction

Social network website plays a significant role in people's social lives, and it has been utilized as a platform for political campaigning, protest mobilization, political expression, and debate. (Jackson, 2014) Nowadays, people prefer to view social network sites because they believe that the social network website such as Facebook is a good platform for sharing information and personal views. However, pornography and extreme violence are widely spread on social network sites, which cause certain harms to the society. (Malamuth& Koss, 2012) In consequence, an increasing number of countries have to enhance their powers on the Internet. Over the past few years, these governments have enacted some stringent policies on regulating their citizens' online activities, and meanwhile they have made some progresses on regulating their Internet.

According to some related information, the primary purpose of Internet censoring states is to block sites related to child pornography, suicide attack, drug abuse or production because they are not suitable for Internet users. (Duffy, 2015) Admittedly, however, the government does not need to perform some forms of censorship. It seems like that the numbers of people who start to oppose against governmental censorship policy will probably increase. This is because some Internet policies are so harsh for Internet users and thus some of the users are not willing to blog anything because of fear. Such type of fear may influence the daily communication of people. (Roberts, 2015)

Internet censorship is the process of analyzing and supervising the information related to national security and social stability. (Kiriya&Sherstoboeva, 2015) Since 2000, the US federal government has started to assess their purchased products on national security system in their country. (Stabile et al., 2013) The primary purpose of the governments' decision is to make sure that there are no technical flaws on their national security system and federal government system. The object of censorship assessment mainly focuses on the Internet products and related service in the United States. Notably, the US government has made significant efforts on the evaluation of Internet service providers in their country.

Regarding the censorship in the United States, the majority of people probably know that the US government has never released too much detail of their standards and process of Internet-related censorship. (Singer & Friedman, 2014) This is because some factors may pose an adverse impact on national security, public interests, and justice. The US government has to consider the potential risks of national security, public internets, and justice. It is noteworthy that the federal government has never explained why the government blocks certain sites, and they have never accepted any appeals from Internet provider either. (Kopel, 2013) Indeed, the Internet censorship is compulsory in the United States because the federal government has been concerned about cyber security issues in their country.

According to the National Security Telecommunications and Information Systems Security Policy (NSI1SSP) in January 2000, all the IT products, including Commercial Off-the-Shelf (COTS) IA and A-enabled Information Technology (IT) products, should be evaluated before they are used on the national security system. (Edward, 2000) Those products would be assessed and validated in accordance with related criteria, schemes and programs. Moreover, they would be accurate to three sub-bullets.

By December 2011, the US government announced that the Internet provider who provides cloud computing services to the federal government has to accept risk assessment and get authorization from the federal government. Besides, the federal government cannot use any uncensored cloud computing services in this country. Finally, all of the infrastructures, which provide cloud computing services to the federal government, should be within the United States. (Wheeler, 2014) There is the evidence that the US government censors online information through corporate control. As disclosed by several former Facebook employees, Facebook routinely censors Conservative news story, which poses an impact on the US federal election. (Nunez, 2016)

Compared to the United States, Japan may not interfere too much with their Internet. However, they believed that some damaging information, such as pornography and extreme violence, should be stay away from teenagers. It is very strange that the Japanese government does not highly censor some porn sites that are probably seen by teenagers. By April 2009, to block children's access to porn sites via mobile devices, the Japanese government released a new policy that the Internet provider has the responsibility to regulate the Internet. (Aggression & Roles, 2011)

Once the Japanese government found any obscene content on their sites, they can remove them immediately. Also, the Internet provider can execute mobile phone identification policy so that they can confirm Internet users' age through their membership authorization system. This is because users should register their accounts on the website with their real name and ID if they want to use the Internet.

The Internet users should use their passwords to log in their account if they use the Internet. Besides, the Internet provider ought to make sure that information-filtering software must be installed on each mobile device if the user is under the age of eighteen because it is necessary to prevent the teenagers to browse harmful information on the Internet. The Japanese government provides free information-filtering software to the public, but it is optional to be used by Internet users. However, this application is compulsory to be installed on the teenagers' mobile devices unless their parents agree to uninstall this app on their children's devices.

The Internet censorship in South Korean is draconian. In this country, the Internet users have to submit their detailed personal information including their real name, address, ID number, and occupation if they want to apply for their accounts or email address on

each website. (Oh et al., 2010) Besides, the administrator has to verify each applicant's personal information before they provide accounts or email address to the applicant. (Rosen, 2003) By doing so, the government wants to prevent the Internet user from applying an account with fake personal information because hackers can use false information to engage in criminal activities.

The administrator could verify users' personal information via messages if the Internet user is under 17 and has no ID. It is worth mentioning that people need to provide their identification if they want to purchase a mobile phone in South Korea. As a result, the government can easily track user's identities by cooperating with cellphone operators. Admittedly, the Korea government makes a significant achievement in preventing the obscene content away from their teenagers.

Regarding Internet censorship, the majority of people typically think of government censorship. Generally speaking, different countries have different ideologies. Some states may restrict people's access to Internet and censor some information on Internet for various reasons. This is because these governments believe that some information on the Internet has potential risks and will do harm to their countries. In consequence, these governments have no choice but to enact a serious of laws and decrees to regulate their Internet.

Corporations can regulate the Internet in their organization and limit the information release. (John et al., 2006) Indeed, the government may stimulate corporations to restrict Internet access to some obscene contents, such as child pornography and extreme violence on the Internet. In general, the government has already identified what kind of online information is obscene and harmful to children (e.g. child pornography and prostitution) and what kind of online information may pose threats to national security (e.g. hate speech and separatist activities). (Duke Law Journal, 2009) (OpenNet Initiative, 2010) In the meantime, organizations want to make sure that their Internet is only used for the purpose of corporation, and they always block entertainment content on their Internet. Also, organizations block outside email service because they believe that the email might be used for releasing trade secrets or other confidential information.

It is worth mentioning that Internet filtering software has been widely applied by schools and libraries to block some information which may be unsuitable for school or library setting, such as pornography, advertising, chat, gaming, social network, and online forum sites. (Spacey et al., 2013) The Reporters without Borders published a Special Report on Internet Surveillance and wrote a list of five "Corporate Enemies of the Internet" in March 2013. They include Amesys (France), Blue Coat Systems (U.S.), Gamma (UK and Germany), Hacking Team (Italy), and Trovicor (Germany). (Reporters without Borders, 2013) As claimed by the author, the list was not exhaustive, and the numbers of Corporate Enemies would increase in the future.

This thesis takes a fresh look at corporation censorship on some famous social network sites including Facebook, Twitter, Google, Reddit and Imgur. The majority of censoring and blocking activities from social network sites are based on keywords or phrase searching. Admittedly, the "keywords filtering" is an effective way to enforce censorship. (Yangyue, 2014) However, this method does not always work and it will probably block the access to valuable information that users want to see. On the other hand, users can still gain access to the existing pornographic materials which should be banned on social network sites.

Compared to some previous studies of Internet censorship, this thesis mainly explores the blocked information on some famous social network sites. Most of previous studies related to this topic always focus on political censorship and the criticism to political censorship. By contrast, this research concentrates on a different area. It has been stressed in the thesis that the political censorship is compulsory, but it is unnecessary for social network sites to practice too much content filtering. Also, the thesis makes a comparative study on how corporate censorship is implemented in different regions.

Generally speaking, the government allows corporations to practice self-censorship by adopting policies and making decisions on what kind of information should be censored. In other words, corporations have to formulate some related policies based on a series of local laws and restrictions. It can be found that corporations practice different levels of censorship in various countries by measuring censorship in different countries. Finally, the results listed in this thesis are based on keywords searching on those famous social network sites. It shows that social network sites apply different censorship policies in regions, and the results of corporate censorship may be far worse than people anticipate.

Chapter 1.1: Research questions

This thesis aims to verify whether some "so-called" sensitive information has been banned on five main social network sites. To analyze the censorship data, it explores the following three questions: (1) What kind of content is frequently censored by these five social network sites? (2) Which site practiced more content filtering on their pages? (3) Which county emphasizes censorship on these five social network sites? Generally speaking, these social network sites implement different levels of censorship and countries also execute different censorship standards for SNSs. The current issue is that some information still should be censored, yet it is not necessary to make censorship on each SNS. Meanwhile, a few social network sites have banned some information that should not be banned.

Chapter 1.2: Hypotheses

In general, such posts that violate "Community Standards" will no longer exist on social network sites because they have been removed. It seems to be difficult to judge whether certain keywords have been blocked on each site. However, it is easy to find out the blocked information in chatting sessions of Facebook because users will receive warnings if they send messages with information in the blacklist. Besides, lots of harmful information still spreads through private conservation on social network sites.
H1: Private conversation will get more censorship than posts.

Apparently, the political debate is unattractive for many people because political issues involve potential risks, such as encountering disagreement, experiencing discomfort and disrupting social relationships. According to some related information, Kahne and Westheimer made the statement of 'civics without politics' in 2006. (Thorson, 2014)
H2: Some sensitive political words will be censored.

Furthermore, one aim of Internet censorship is to block sites that promote child pornography. Recently, Reddit has started to censor child pornography and any other sexual content. (Workman, 2014) These findings suggest:
H3: Some keywords related to pornography will probably be censored on each site.

Internet censorship in South Korea is draconian, and this country has made a significant achievement in preventing the obscene content away from their teenagers. (Oh, Y et al., 2010)
H4: South Korea will censor more information than any other countries.

We also expected **H5:** Other countries will not censor much of keywords in the test data because New Zealand, United States, Japan and Russia will not censor certain information that is accurate to particular keywords.

The personal information refers to age, religion, income, politics and sexual preference which have been seen as private thing. (Georgalou, 2016) Reddit restricts users to post such personal information. (Anderson, 2015) It is critical and compulsory for social network sites to protect personal information.
We expected **H6:** social network site frequently censors those keywords related to personal information.

Such type of censorship probably involves with censoring activities on individuals' name as well as their religion, income, politics and sexual preference. However, it may not involve with some famous people. Generally speaking, famous people refer to superstars, pop stars and entrepreneurs. It is easy to seek out SNSs for their personal information.

Generally speaking, hot topics always exist on the front pages of each social network

site. For instance, users can select to browse posts from the primary page of Reddit because of Reddit's 'Hot' ranking algorithm. (Mills & Fish, 2015) Also, Google implements its PageRank algorithm for ranking its search results. (Menell, 2012) The problem is that some hot topics can also pose negative impacts on the society. During the parliamentary election of Russia, an unknown attacker used Twitter for subverting political conversations. As a result, it caused governments to censor more hot topics on social network sites due to the fear of their social impact. (Thomas et al., 2012)

We expected **H7:** keywords related to hot topics will be censored more.

Chapter 2: Literature review

2.1 Review of Facebook

Jackson described Facebook as one of the most popular social network sites (SNSs) in the world. It has a distinct characteristic, namely supporting pre-existing so-called real-world social relationships. As mentioned by Sirichit, Facebook has a broad range of virtual products all over the world. He also pointed out that Facebook and any other Social network sites like Google are not only the pioneers of online communication. However, they have become the major means of communications and online expressions currently. Because of the network effect, the public's dependence on social network sites has been increased rapidly. (Sirichit, 2015) As claimed by Facebook, their purpose is to give people a platform for sharing information and making the world become a better place to connect with each other. (Jackson, 2014)

Jackson (2014) described Facebook has more than 800 million users, which can receive over 500 million site visits each day. In the view of some people, social network sites are the "social content farms" because users can generate and discover their content production sources in SNSs. (Sirichit, 2015) Facebook allows users to disseminate information to a significant number of audiences at the lowest cost. (Jackson, 2014) Besides, users can review an image or a post in which they are tagged before it appears on their Facebook pages and then make a decision of whether they want or not. (Georgalou, 2016)

By using this application, people can communicate with their families and friends without any cost. No matter where they are, they can upload their photos on Facebook and share with their buddies. It seems like that Facebook belongs to the public community, but it is controlled by the service provider. Indeed, Facebook has its standards about what kind of behavior is allowed on this site. As a result, free speech does not exist on this site. In the past few years, Facebook has been strengthening its powers on censorship.

It is very strange that Facebook blocks millions of users' political opinions because they suspect that these users want to achieve their political or financial purpose, while SNSs allow politicians to interact with tens of thousands of their supporters. (Kwon et al., 2015) Kwon and Moon described Facebook and any other SNSs have become a useful way of politically relevant information, activities, and interactions. Additionally, there are more than half of adults in the United States who have viewed political information shared by their networked friends through SNSs. In Barack Obama's 2008 presidential campaign, candidates can interact with a high number of their supporters via social network sites within one day. (Kwon et al., 2015)

In 2011, the supporters of Occupy Movement in the United States also used social

network sites, such as Facebook and Twitter, to organize protests to the government. (Kwon et al., 2015) The number of participants who browsed more than 400 Facebook pages about this movement reached 2.7 million. It followed by more than 100 Twitter accounts with tens of thousands of followers concerning about this event.

Sirichit described there is a plenty of evidence showing that Facebook has committed to content suppression. Some SNSs service providers, such as Facebook and Google, design algorithm against online speech that tests boundaries and challenges existing notions. (Sirichit, 2015) In general, Facebook will log you out when they remove your posts, while it will inform you clearly why your post is deleted. Also, they will enforce you to click a checkbox and declare that you understand their "Community Standards". Otherwise, you cannot log back in. Facebook users might experience one or more forms of speech suppression.

In general, Facebook will enforce a series of vague 'Community Standards' to speech suppression. For instance, the moderators of Facebook can remove any posts that seem "inappropriate" without any reasons and users have no opportunity to see the notice or warning. (Sirichit, 2015) Facebook tend to automatically remove users' comments and classify them as "spam". As a result, the majority of Facebook users cannot see the "Promote" feature at the bottom right corner of their posts, and they even do not know how many visitors reach their post.

An increasing number of Facebook users complained that the speech suppression on Facebook is far worse than they anticipate. (Sirichit, 2015) This is because website links and any other external information posted on Facebook have been heavily censored in the past. In consequence, the users have no choice but to accept the agreement from Facebook. Besides, they cannot post any contents, such as pornography, hate speech, nudity graph, and violence words. It seems like that Facebook has strengthened its power on Speech Suppression to a new dimension. However, they are not just satisfied with censoring the advertisements on their website and enforcing the vague "community standards".

Obviously, it is unnecessary for Facebook to enforce harsh censorship. Indeed, too much censorship on social network sites can influence people's judgment and decision making. This is because it is imperative for people to acquire knowledge on health, safety and welfare as browsing the sharing information on social network sites. Facebook claimed that their principle is to balance "the requirements and profits of every user in the world" by performing the so-called "Community Standards". (Sirichit, 2015) In these years, Facebook has been dedicated to opposing nudity and violence content on their pages.

Some Facebook users are unsatisfied with the censoring and blocking activities of political expression and artistic content in spite of their significance. (Sirichit, 2015) Meanwhile, Facebook has failed to protect users' privacy, which may violate privacy laws in many countries. As a result, people begin to suspect that how will the "Community

Standards" achieve the success in the future. In fact, shortcomings of Facebook's censorship are very visible because the company executes double standards of policy. For instance, it is unfair for Facebook only to disfavor a part of political themes yet ignore any other political topics.

According to the statement of Facebook, people are encouraged to post any graphic images about human right issues, and they have the right to share their perspectives on these matters. (Kushin & Kitchener, 2009) However, the company always removes content such as human-right abuses and homosexuals. Facebook rarely admits that its autonomous censorship is imperfect and will possibly cause censorship accidents. (Sirichit, 2015) As emphasized by the company, they delete user's photos and the posts are individual operations.

Sirichit claimed that Facebook blames every removal mistake to human errors in multiple cases. However, there is no clear evidence to prove that the human administrators have done the majority of censoring and blocking activities on Facebook. As stated by some artists, Facebook should not be too rigid like a robot, and they should be able to distinguish pornography from art in their "Community Standards". (Ballard & McKinlay, 2011) As a matter of fact, the relationship between Facebook and social content farms is far more complicated than people anticipate. To improve the quality of Internet content on Facebook, the company adopts a meme-defeating filter by using a new generation of its newsfeed algorithm which is known as "Facebook Panda". (Sirichit, 2015)

The company has surveyed their users about how to identify the quality of social content because they want to be a good social content provider. (Sirichit, 2015) However, no one knows how Facebook draws the conclusion related to the quality of content shared on the Internet. Critically, Facebook cannot deal with each piece of content without prejudice. As a matter of fact, Facebook can acquire more profits from advertisements by enacting a series of quality criteria to discriminate the content. This is because the company can easily formulate accurate advertisement placements, and meanwhile sponsors are more likely to establish relation with premium-quality content.

It seems like that external pressures and internal pressures will probably lead to censoring or blocking activities on social network websites, especially in a theocracy and Communist country. To prevent certain criminal actions on the Internet, Facebook and any other social network sites (SNSs) have no choice but to censor some content on their sites or block some particular users' access. Firstly, SNSs will probably edit users' communications because there is always someone who harasses or treats other users with evil motives. Secondly, Facebook and any other SNSs intend to create a better network environment for users of different ages and sensibilities. Thus, they expand their efforts on the censorship of pornography and extreme violence. Jackson mentioned that creating a better forum for people to communicate with each other can increase its value to advertisers. Thirdly, such censorship is compulsory because the number of individual

cyber-crimes, such as phishing attacks and hacking, has been growing in recent years. Finally, to perform censorship, it is essential to obey a serious of laws, including copyright law, trademark laws and regulations of governing publicity. (Tushnet, 2000) Admittedly, such censorship might be abused or even to be applied out of scope. However, their censorship is useful to maintain the network environment and attract users to certain social network sites. (Jackson, 2014)

Recently, many citizens find it more difficult to make political conversation because talking about political topics is more sensitive than any other forms of discussion. Thorson described that political debate seems to be unattractive for many people. Additionally, it would be forbidden by families in dinner time because political issues involved in potential risks, such as encountering disagreement, experiencing discomfort, and disrupting social relationships. Sometimes, unwritten rules of interaction will significantly influence the guideline to appropriate social behaviors. As indicated by some studies, facilitating or hindering political talks may lead to changes of social settings. It is reported that Facebook has caused significant effects to expand people's social spheres through its ego-based social network and made the posts on Facebook pages more selectively to a subset of your friends. (Thorson, 2014)

Sometimes, several kinds of context collapse will occur in the display of posts. However, algorithms, privacy settings and the "Community Standards" of Facebook change constantly. Thus, Facebook users can neither grasp visitors on their posts nor control the context of their post. Apparently, a range of behaviors from Facebook merely enhance the challenges for young citizens to imagine their supposed audiences and to accept any contexts for risky political posts. (Aimeur et al., 2010) Facebook has to put more efforts on censoring political content, but users may not like such censorship.

According to some related information, Kahne and Westheimer made the statement of 'civics without politics' in 2006. (Peterson, 2014) Only 'neutral' versions of policies are protected and supported. In fact, the neutrality concept is merely for opposing political expressions. The idea of humor is known as an approach to neutralize political expressions so as to make sure the safety of sharing.

Facebook becomes increasingly cautious about carrying out its censorship policies and usually encourages users to self-censor their uploaded content. Until today, Facebook has invited artists to double-check their uploaded content related to blurring nudity. (Blue, 2015) Generally speaking, social network sites will not modify any inappropriate content because they will just remove them. Also, some controversial contents, which violate any of "Community Standards", are also censored by Facebook. (Sirichit, 2015) To prevent the spread of such controversial content on Facebook pages, they always utilize technologies, such as halting "likes", to stop them from becoming headlines.

Facebook blocks some of the users' activities for fear that they post any images or

comments with political statements. (Sirichit, 2015) It can be seen that Facebook does not have clear criteria to block users' comments, and they would only claim that the users' comment is "irrelevant or inappropriate". The most common censoring or blocking activities on Facebook are based on its algorithm. However, the performance of this algorithm is far worse than people anticipate. Some users' comments might be identified as spam messages by this algorithm. (Bhattarai et al., 2009)

According to some related information, the freedom of speech, the freedom of the press, and the freedom of association refer to the fundamental human rights in the First Amendment. (Zick, 2015) Although the First Amendment focuses on scrutiny and its actions interfere too much with its private property rights and capacity to manage its business, it could step up the efforts to destroy some malicious sites, such as pornography distributors. (Jackson, 2014) However, the situation of censorship enforced by social network websites is not quite optimistic, and people start to doubt how much success it can achieve in the future. This is because users do not know whether the First Amendment can protect their private communication on social network websites. With the development of Internet, the First Amendment has been extended to the protection of communications on the social network sites.

Facebook plays a significant role in people's daily lives. Any of Facebook users can selectively share their thoughts, experiences, and ideas to others. Besides, individuals can not only add any other users as their friends on Facebook by sending requests to them but also enable them to browse the sharing of public or semi-public messages such as posts, images, and private messages. The problem is that Federal courts do not consider Facebook as a state actor because it has issues on the contracts with governmental agencies.

As a matter of fact, communications on social network websites are not completely protected because censorship enforced by operators of social network site has never been regarded as governmental actions. To achieve the higher-quality goals, Facebook encourages users and organizations to spend more time and resources on creating cultural products in the social network environment. (Sirichit, 2015) Generally speaking, users can not only decide whether to share their content but also block people from viewing their content. Besides, the social network sites encourage users for self-censorship. Sometimes, they will self-censor or choose not to share their content. (Sleeper et al., 2013)

The self-censorship means the action of people to prevent themselves from speaking, especially in the face-to-face conversation. (Hayes, 2007) Nowadays, self-censorship becomes unique because it frequently occurs in the social network communication. The majority of users are afraid of unnecessary content filtering from their "spamming" friends. Thus, they try to avoid negative expressions on social network sites. In general, they prefer to self-censor their expressions before their thoughts are formed and expressed. For instance, some of Facebook users will probably explore how to maintain presentation

of their self-representations in different social contexts because they do not want to break away from the perceived social norms of community. (Das & Kramer, 2013)

To reduce self-censorship, some users may use Facebook's privacy settings to avoid content withdrawal. According to a survey of eighteen Facebook users who intend to post on Facebook pages but ultimately post nothing, it can be found that users tend to self-censor their content for five reasons. (Das & Kramer, 2013) Firstly, they just do not want to cause instigation or involve into an argument. Secondly, they do not wish to offend any other users. Thirdly, they have no intention to bore any other users. Fourthly, they do not want to post any speeches that have an adverse effect on their self-representations. Finally, users may overlook the technological flaw with their posts. Das and Kramer mentioned that it is inconvenient to display content by using mobile apps. According to the concept of censorship, the first four reasons can be considered as an audience control strategy.

When it comes to how Facebook regulates self-presentation by privacy settings, the majority of personal information, which is currently known as private thing, is age, religion, income, politics and sexual preference. (Georgalou, 2016) Generally speaking, the personal information is utilized by users to apply for their accounts on social network sites. Hence, it is critical for contemporary social network sites to protect the basic information. Georgalou described the Facebook outsiders do not realize that disclosing and sharing such information has a compromise of their privacy. As for Facebook insiders, the problem lies in that they do not know how to be public without being in public. Today, Facebook users usually encounter four technological affordances that can affect their privacy in the interactions:
1. *Persistence:* Once users post any content on Facebook pages, it will be automatically recorded and cumulatively archived. For example, historical dates will be automatically registered in the Facebook Timeline.

2. *Replicability:* Users can reproduce the content via the facility of 'Share'.

3. *Scalability:* Invisible audiences can view the content. For example, people can see the Ticker on the right-hand side of any Facebook page.

4. *Searchability:* People can not only get any content on Facebook pages via search engines but also browse any posts from a particular date in Facebook Timeline if the profile is public. (Georgalou, 2016)

As a result, Facebook users have to think critically about how to share their personal information. (Sirichit, 2015) Sirichit mentioned that making these decisions requires an advanced digital, socio-cultural and ethical literacy form. Beyond that, the Internet would be less like a public forum for free speech. However, it will not become a strictly regulated place that is also full of premium-quality content. The transformation of Internet could be guided seamlessly by the development of self-executing algorithm that is used for

regulating users' online activities.

2.2 Review of Twitter

Recently, social network sites have turned into a major platform for political discussion and dissent. (Ceron et al., 2014) For instance, the U.S. government communicates with citizens and drives public discourse by using Facebook, Twitter, and any other social network sites. (Thomas et al., 2012) Unlike some traditional media such as newspapers, companies like Google and Twitter pose one or more impact on the freedom of expression. (Ammori, 2014) Some digital platforms like Twitter have increasingly become the primary mediums for speech because the speech on social media sites almost comes from users. However, the speech on traditional media like newspapers almost comes from employees.

It is well known that Twitter is one of the primary sources of data for social media researchers, and it takes a global and compatible method so that users can hear a variety of voices on Twitter. (Petrovic et al., 2013) Ammori described Twitter is free to users because they generate income on advertising. Because of the perceived accessibility, Twitter is particularly compelling among many big social data sites. Compared with some mostly closed-off to the academic community like Facebook, tweets are smaller in size. However, it is public by default as well as numerous and topically diverse characteristics. (Driscoll & Walker, 2014) It has a plenty of data for researchers, and the investigators are usually interested in public opinions and general communication.

Driscoll and Walker described that tweets can represent the visual integrity of news and scholarly publishing which have been summarized into some forms of statistics, tables, and charts using commercial analytics software. The Twitter data, which have been summarized into user comments and dynamic charts, are becoming increasingly popular on websites, newspaper and conference presentations. (Driscoll & Walker, 2014) Indeed, Twitter refers to a dynamic system subject, and its interface features and data formats change constantly every day. The Twitter data provided today might be entirely different tomorrow.

The problem is that people did not realized the transformation of massive Twitter data into small tables, and meanwhile charts are not enough for explaining the process of data collected, stored, cleaned, and analyzed. Readers cannot make sense of the given methodology that they described as social phenomena. On the one hand, the strength of Twitter is obvious because of its freedom. The concept of freedom expression is no longer for an institutional press but for everyone. (Baker, 1992) In consequence, the core business functions of Twitter, Facebook, and any other SNSs begin to shift to freedom expression. (Ammori, 2014)

Ammori described Twitter regards itself as an Internet platform for the freedom of speech: the former general counsel calls it "the free speech wing of the free speech party"

and its CEO calls it the "global town square". Beyond that, the cofounder of Twitter considers that "the tweets must flow" that they set it as the default principle against blocking speech. Evan Williams, as one of Twitter's cofounders, he has another two companies for user speech: a blogging platform and a curated long-form media website. (Ammori, 2014) Users can share explosive news or something interesting with thousands and even millions of words to their fellows by just writing in fewer than 140 characters and clicking the "Tweet" button.

Social network site such as Twitter has become a pioneer in creating the "new media" which is also described as "networked public sphere" by Professor Yochai Benkler. (Ammori, 2014) Billions of users all over the world can express and read instantly via these sites. Twitter and other social network sites not only facilitate the cultural exchange but also develop a global village where people live. (Iosifidis, 2011)

The popularization of Twitter breaks the monopoly of traditional media that used to break, recount, or spread news and commentary. It may be surprising that the death of Osama bin Laden is firstly leaked on Twitter before it is reported on newspapers. (Ammori, 2014) On the other hand, too much freedom might be the biggest shortcoming on Twitter. According to the report, an unknown attacker used 25,860 fraudulent accounts to send 440,793 tweets to try to subvert political conversations following the announcement of Russia's parliamentary election results. (Thomas et al., 2012)

Regardless of the complexity of this attack, it can be seen that Twitter's relevance-based feature can help reduce the impact of attack on users' search for news about the Russian election. (Thomas et al., 2012) Several years ago, the freedom of speech was not restricted in Twitter because nobody would censor online speech at that time. One time, the company claimed that they would not excessively censor user content, unless in limited circumstances. (Newland et al., 2011) As a matter of fact, Twitter's policy had been changed several times before 2015 because the company wanted to make it easier to forbid people from involving in spam and fraud.

Since 2015, everything has been changed. The company started to modify its previous policies because an increasing number of Twitter users have confronted with abuse and harassment in the past few years. Many people in the democratic society have realized that censorship does not mean infringing the freedom of speech. As a matter of fact, the freedom of expression has been utilized as a tool to silence vulnerable and dispossessed people.

Surprisingly, Twitter has to censor its users so as to maintain its situation for free speech. Compared to any other social network sites, Twitter enacts necessary safety policies. As claimed by the company, the freedom of speech is a basic human right and people are supposed to speak truth to Power. Also, they think that the voice is silenced because people are afraid of speaking up in the sense of philosophy.

As pointed out by Twitter, they intend to make sure that people can feel safe to express their ideas and beliefs from the beginning to the end. In consequence, they do not interfere too much about users' online behaviors such as harassments and threatening, or utilize fear to stop other user's voice. (Driscoll & Walker, 2014) Some people may want Twitter to ban on hate speech. However, whether it will reduce harassment remains to be seen.

By using Twitter, people can broaden their horizons because it reflects humanity including its best, worst and everything in the medium. Since Twitter is a private company, it is allowed to have its own views. However, there are still many conservatives believing that Twitter is too stubborn to accept their opinion as a liberal. The majority of Twitter users prefer to "listen" to the tweets from others. Besides, they rarely send a tweet on their own because they are afraid of censorship. (Driscoll & Walker, 2014)

Facebook and Twitter, as the important platform for political engagement and dissent, have been involved in censorship. (Thomas et al., 2012) Censorship of Twitter is quite common, and Twitter supports many countries' censoring or blocking activities in their states. Generally speaking, users in certain countries will receive the notice from Twitter that they may not see the site because the company has approved the complaint from governmental officials and some organizations. Even though laws and social norms play a significant role in enacting online speech policies, the authorities rarely take unilateral actions to block Twitter without any reasons. (Ammori, M., 2014)

As demonstrated by Christensen, it is essential to use Twitter as a tool for communication and regard it as a symbol of free communication. For example, the use of Twitter by Swedish government reflects how a country regulates its social media for the sake of information dissemination, public relations, and propaganda. (Christensen, 2013) Christensen also described the current issue is that Twitter provides high ranks of privileges for immediate communication with global users and has caused reputation lose due to the lack of censorship. Although Twitter has its privately-owned media, it finally compromises with national governments and begins to regulate their online content.

The majority of people may not know that Twitter is under the threat of punishment by various countries. They have no choice but to make it compulsory to censor its users. (Liu et al., 2015) Sometimes, Twitter deletes tweets from web pages for multiple reasons. The reasons for deleting tweets might be privacy concerns, rashness or attempts to undo public statements. (Petrovic et al., 2013) Twitter forbids hate speech and it has started to ban revenge porn on their sites. (Waldman, 2015)

Furthermore, any expressions, which may promote terrorism or racism, are prohibited by Twitter. The company believed that any tweet collection must comply with post-hoc deletion requests. (Petrovic et al., 2013) In consequence, Twitter forbids the distribution of raw tweets, meaning that users should send requests to Twitter if they want to delete their tweets.

Compared to the mode of using email, people utilize tweets in a unique way. Additionally, users have critical applications if their tweets might be retracted: (Petrovic et al., 2013).

Security: Admittedly, Twitter is so common that users usually do not take the potential confidentiality implications into account before they tweet.

Regret: Sometimes, users will probably tweet with offensive or inappropriate content, but they may regret it later.

Public scrutiny: Some politicians may withdraw their tweets after they tweet some content.

Some researchers have surveyed the reasons for 200000 deleted tweets, and they confirmed the status of user's account by querying Twitter's API. According to the finding, there are three different statuses. First of all, the account exists. Secondly, the account exists but it is under protection. Thirdly, the account no longer exists. (Petrovic et al., 2013) The reasons as to why in the first type, while the account exists the user may have deleted their tweets could be probably because users have now decided to focus on other cases and hence have manually deleted their previous tweets.

However, the deleted tweets from those accounts under protection are probably not deleted, and only a small group of users can read them. It is worth mentioning that the third type of account has been entirely removed and their tweets do not exist anymore. Although users can eliminate their accounts by themselves, under most cases, Twitter deletes their accounts because these users send too much spam. The majority of the deleted tweets are not simply a consequence of removing spammers, and they are genuinely removed by Twitter. It seems like that Twitter usually predicts deletions rather than spam tweets. (Mohanraj, 2014)

Although the majority of social network sites have strengthened their powers on regulating the web pages, some adverse events seem to be inevitable. For instance, when Arab Spring spreads across the Arab world, Facebook and Twitter are adopted for organizing that movement. (Frangonikolopoulos & Chapsos, 2012) Also, what deserve people's vigilance is that Mexicans discuss about the violence of drug cartels via the social network sites, although it is a lack of official news reports. (Womer & Bunker, 2010) In response to the chaos in London, the United Kingdom government threatens to ban some users' Facebook and Twitter account. (Lock et al., 2013)

The latest example happened on Twitter is associated with the protests to Russia's parliamentary election. (Thomas et al., 2012) The protest occurs in Moscow's Triumfalnaya Square and it quickly spreads on the social network sites. During the protest, both pro-Kremlin and anti-Kremlin parties declare their opinions about Russia's election outcomes on Twitter. Finally, some attackers use a wave of bots to communicate with users. Moreover, they try to control the conversation and subvert search results related to this election. It shows that to manipulate social networks, the fraudulent accounts and the

methods of bypassing the requirement for Internet monitoring might be utilized for political motives.

Since the Hashtags came out on Twitter, it has become a mechanism for organizing conversation among each topic that displays out of user's social graph scope. (Thomas et al., 2012) In consequence, users can capture both local and global trends about favorite conversations via Twitter's search functionality for more detailed queries. Regarding the message dilution, users can embed hashtags in their tweets. However, a particular attack will influence the conversation. (Thomas, 2013) The implementation of Twitter's censorship relies on its internal spam detection algorithm. Nonetheless, Twitter still does not release how this algorithm is implemented. Currently, Twitter aims at posting misleading content or irrelevant content to the trending topics, posting duplicate content, frequently developing relationships or posting to multiple hashtags. (Michalakos, 2015)

Generally speaking, these kinds of spam serve as the information for trade in spam-as-a-service markets. Also, these types of information contain email addresses, network proxies, fraudulent accounts, and compromised hosts. However, the services have specifically surpassed the range of spammers because executing attacks on Twitter requires thousands of compromised machines and accounts. These devices and accounts can be available on spam-as-a-service markets.

As described by Ammori (2014), the company has taken a series of actions to regulate users' online activities in response to certain negative events on Twitter. Firstly, Twitter's first general counsel establishes the trust and safety team in its first orders of business to guarantee the information security among user's communication. Secondly, Twitter chooses to follow comprehensive use of both second and third paths (highest common denominator and country-specific) to reply national-level censorship requests in country-specific. (Ammori, 2014) This is because Twitter has a relatively light service regarding the usage of data. Additionally, most of their servers were located in the United States in the beginning of the first few years.

The advantage of this approach is that Twitter is under the protection of America's free speech protection. Through this policy, they can respond to censorship requests from other countries. Finally, Twitter implements country-withheld policy around the world. Before banning some tweets in a particular country, Twitter can receive official notice that certain speech is not allowed in that country. (Ammori, 2014)

2.3 Review of Google

A long time ago, Google had only one version- Google.com. People in the world can get the same searching results. Then, Google starts to change the searching results what they have served. For instance, if people search for football in the UK, they can get the results called soccer rather than American football.

Users may not know what has exactly happened in Google. However, without doubt, Google had been establishing country-specific versions of Google in the past few years. As a result, different versions of Google are built in various countries because their company wants to make it easier for the users to obtain country-specific search results. Until today, Google has implemented censorship demands on "country-specific" version of Google that is likely to cause global changes for everything.

The company has contributed to persuading various countries to censor its searching results all these years. As a result, both Google and government need to confront with the hard decisions of censorship. Only the minority of countries take direct actions to ban Google as well as any other related service on Google because they may be unsatisfied with the response to their request. (Rushe, 2012) Google once refused the request from Pakistan for removing six videos listed on YouTube that satirized their army and senior politicians.

In September 2012, Pakistan banned YouTube for the purpose of deleting a controversial movie. After that, some related Google services, such as Maps, Drive and Play Store, were banned because the users could use the same IPs among all of these services. (Nabi, 2013) Recently, Pakistan blocked some popular websites, such as Google, Facebook, Wikipedia, and YouTube successively. (Chaabane et al., 2014) Although censorship events occur in countries, there are still many users in Pakistan and Turkey. The related data of Google Trends and YouTube Statistics shows that some blocked videos become more popular after they are censored. (Nabi, 2014)

The county-specific version of Google does not use a free search engine and it is separated from Google headquarter. Thus, users can still obtain the same searching results via Google.com only when Google takes actions. Generally speaking, users will just get different contents when they search in a particular state. For example, users can obtain more search results in the language of a particular country through a county-specific version of Google.

The habits of using county-specific versions are difficult to break. However, people still used to opening up Google.com even when the country-specific versions have been established. To solve this problem, Google have spent ten years to redirect people. Eventually, the user can get redirected to a county-specific version of Google if they try to reach Google.com.

Notably, Google is defined as an ethical company, and its motto is "Don't be evil". (Baker & Tang, 2015) The company is not satisfied with their product because there is a controversial issue with its search engine. Since Google is established, it has started to censor its search results. They mainly target at those sites that are recognized as violating its spam guidelines.

Google always takes actions by itself and it often censors any content that violates

US Digital Millennium Copyright Act. (Cobia, 2008) However, Google has to follow that policy because it is a US-based company. When Google becomes the most popular searching engine in the world, it starts to follow law worldwide.

However, as the US law, DMCA removals happen globally. Since Google is an American company, thus probably only American censorship can be applied. Ridiculously, however, Google implements American censorship to any other countries. For instance, Google does not remove content from Google.com but removes materials from county-specific versions such as Google UK or Google HK. As a result, people may not be happy with another country imposing political censorship demands on their country.

Google has to enact its self-censorship by conforming to local laws and regulations that require them to remove certain information. (George, 2013) For example, users can not get any search results if they search for "Nazi" on Google Germany, because individual Nazi-related sites are not allowed in Germany. (Zittrain, 2009) This type of censorship might be Google institutes IP-based censorship. Google will trace users' IP address and telephone number. If the user stays in the particular country, they will get censorship in those countries.

As a matter of fact, such type of censorship is not implemented globally. Thus, American censorship is not imposed on citizens from other countries. Notably, Google occasionally censors its general searches as well. The default of Google refers to the "moderate" setting of Internet filter, which is also called "SafeSearch". (Heins, 2013) This method will be used for removing screen sites that contain pornographic contents from your searching results.

As claimed by some users, they can still access to porn sites as long as they search more accurate search request on Google. For instance, they may search for explicit sex education information instead of simple keywords "porn". Users can still access to the blocked information because certain pieces of information might be available on blogs even though they are removed from Google's search results. (Nabi, 2014) Admittedly, this type of censorship is not only useless in restricting Internet access but also poses an adverse effect on generalizing the blocked content.

Through the previous researches on Google Trends, YouTube Statistics, and Alexa Web Rankings, it can be found that certain censorship is ineffective, which will even cause the dissemination of restricted content on Internet. (Nabi, 2014) As a result, some search engines, such as Google, have no necessity to impose censoring activities. As stated by Heins, one of the primary objectives of section 230 of Google is to prevent private-industry censorship. In consequence, free expressions can be accessible on the Internet. (Heins, 2013) However, those responsibilities for illegal and illicit speech can be prosecuted.

Google approves 47% of informal requests for content removal as well as 65% of court orders within six months. (Rushe, 2012) One time, Google published a bi-annual

transparency report, they claimed that they had received an increasing number of requests for removing political contents on its search results. (Franks, 2012) The majority of these requests come from users in the western democracies. Moreover, these claims are not typically relevant to the censorship. Indeed, the individual requests from countries are not always approved by Google.

As claimed by Rushe, Google had rejected the request from Spanish regulators for removing 270 links to blogs and newspaper articles about criticism of public figures. Additionally, the company denied the request from Poland for removing an article about criticism of Polish agency for enterprise development as well as any other eight links to the article. One time, Canadian officials asked Google to remove a video (in this video, one of their citizens urinates on his passport and uses it for flushing the toilet) on YouTube. (Rushe, 2012), yet it was eventually refused by the company.

Google has received the request from Thailand for removing 149 videos about allegedly insulting the monarchy on YouTube because it violatess Thailand's lèse-majesté law. However, only 70% of these requests are approved. (DeNardis & Hackl, 2015) It seems like that Google has its principle about the removal of its search results and they usually make their decisions about approval or refuse the request from countries. Google has made some incredible decisions which make it difficult for certain countries to understand their intention. In response to the requests relevant to the so-called harassment of people on YouTube from the US, Google only complies with 42% of their request when they ask for removing 187 pieces of information. (Rushe, 2012)

As pointed out by Rushe, the company agrees to the request from UK police to remove five YouTube accounts because someone uses those accounts for spreading terrorism. Google's senior policy analyst Dorothy Chou writes in her blog that they have been troubling over the past few years because different countries sometimes ask them to remove political content the users posted on their services. (Rushe, 2012) They hope that it is an aberration, but not. Thus, they begin to doubt that the freedom of speech is endangering, since a part of these requests come from western democracies and these countries generally are not involved in the censorship.

In terms of copyright infringement, Google once received more than one million requests within one month, and the copyright owners asked them to remove their content from the company's search results. Google's senior copyright counsel, Fred von Lohmann, claimed that the main reason for Google to remove links from search results is copyright issues. (Rushe, 2012) Also, Fred von Lohmann said that the company could receive 3.3 million requests for complaining about copyright infringement each year in the last two years. Finally, the company approved 97% of these requests.

Actually, users have a high reachability to access to the unauthorized works. In response to copyright issues, Google intends to integrate takedown notice data from copyright owners into its Internet search algorithm. (Menell, 2012) Some groups of

scholars and civil liberties feel alert about Google's response to copyright infringement because they do not know whether it is technological progress or censorship.

The development of peer-to-peer technologies may pose both positive and negative impact on computer networks. The distributions of unauthorized works promote national governments to strengthen their powers on social regulation, especially in copyright liability. It is worth mentioning that they encourage the development of filtering technologies to regulate digital technology platforms. For instance, Google has developed the Content ID system for blocking the infringing content on YouTube. (Menell, 2012) The most significant achievement of using this approach is that Google not only renovates copyright issues but also leads consumers into legitimate markets.

Some people are concerned that Google will excessively change the setting of its PageRank algorithm because these technologies may affect the censorship of non-infringing works. (Menell, 2012) As a matter of fact, the advantages of Google's integration of copyright takedown notices into its PageRank algorithm outweigh its disadvantages. Additionally, the improvement of PageRank algorithm indicates the progress of technologies as well as the encouragement of expressive creativity. It can even promote the freedom of expression by deriving benefits from those organizations' efforts on news gathering and commentary. (Langville, 2011) However, it does not mean that there are no potential risks in these shifts. Hence, Google has to make sure that copyright owners do not abuse the takedown process for evil motivations, such as suppressing free expression and interfering with the fair competition. (Loren, 2011)

Hopefully, Google can overcome this challenge. Recently, Google has improved its transparency. To be specific, this company will provide Transparency Report about their current issues and solutions. With the technological progress in the highly dynamic area, the copyright protection, defenses, safe harbors, and remedies play a significant role in the implementation of technological advancements. (Lucchi, 2005) Theoretically, the improvement of these mechanisms can lead to symbiotic technological changes. For example, the creators and distributors of information have become the biggest beneficiaries. (Menell, 2012)

Since Google integrates takedown notices in its PageRank algorithm, a valuable natural experiment around how to maintain the factors affecting technological innovation, expressive creativity, and freedom of speech in a society has been started. (Langville, 2011) In another technological progress area, optimizing search engines for balancing the society's broader interests will continue to develop. It is worthwhile that Google has initiative to reduce the infringing contents in its search ranking. (Menell, 2012) As a matter of fact, the significant difficulty for Google is its capacity to effectively execute this initiative. As a representative of the advanced technology, Google undertakes an obligation to negotiate its role with different stakeholders on ethical issues, such as freedom of expressions, censorship, and information access in the global market. (Baker & Tang, 2015)

As mentioned by Baker and Tang, Google has begun to redefine the relationship between business and ethics, global standards and local compliance, as well as corporate control and state control. Since Google decided to censor its search results on www.google.cn, this decision has become the main controversial ethical issue. As stressed by Google, their decisions are based on the company's values and ethics when they suffer from the criticism of human rights organizations and U.S. government. Beyond that, the most controversial ethical issue among Google is the freedom of expression because censorship violates this principle. As a result, Google gets into troubles and does not know how to manage its roles as a business and an ethical company. To reduce the contradiction between businesses and ethics, Google proposed another pair of dialectics in its 2008 testimony, and divided censorship into ethical censorship and unethical censorship. (Baker & Tang, 2015)

In general, ethical censorship reflects the governments' decisions for a limitation on the freedom of speech. As stated by Baker and Tang, such type of censorship is usually implemented with different policies in different countries because it is based on moral, cultural, or historical ground. When it comes to moral censorship, the most typical example is the censorship against child pornography and extreme violence. There are some examples of moral censorship involving in political censorship in certain countries, such as defaming to the King in Thailand and attacks on Islam in Indonesia. (Baker & Tang, 2015)

Sometimes, political censorship is associated with unethical censorship. This is because Google's definition of political censorship stems from those known as "authoritarian governments", "repressive regimes" and "military government". (Baker & Tang, 2015) Google realizes that every country has different reasons to censor its Internet and it is essential to make some changes on its censorship. The company decides to distinguish contradiction between censoring Internet content and becoming an ethical company. As an ethical company, Google supports ethical censorship and resists unethical censorship.

In the previous years, Google believes that censorship is a local problem, which shall be implemented with localized solutions. However, Google changes its mind in its 2008 testimony. The company thinks that internet censorship will be caused by local standards and it will become a global issue. (Baker & Tang, 2015) Moreover, people will appeal for comprehensive solutions at the institutional level if they encounter such issues.

As demonstrated by Baker and Tang, the current challenges they confront with come from "a broad range of global censorship efforts". Regarding the national level censorship, Google insists that they do not have any problems, and meanwhile they attribute censorship issues to a variety of countries such as Iran, Venezuela and Myanmar. This is because their products, such as Blogger and Groups, have been used as the platforms for free speech in certain countries like Venezuela and Myanmar. (Baker & Tang, 2015)

Google has proposed two solutions for solving censorship issues, which are global standards for both companies and governments. The company appeals for international collaborations to enact global standards for global corporation censorship. In the meantime, Google attempts to adopt general standards that can be applied to all the countries in addressing Internet use. Google takes such standard by entirely relying on the universal values that highlight its testimonies: human rights, freedom of expression, and information access. (Brenkert, 2009) These standards are cited from international policies, such as the Universal Declaration of Human Rights and the International Covenant on Civil and Political Rights. (Baker & Tang, 2015) As the global standards for governmental practices, both standards have been implemented by the United Nations.

Google takes a series of actions to associate with corporate control including disclosure of filtering, and provide transparency report on its service availability and protection of users' privacy. Since 2008, Google has claimed that the company assumes an ethical responsibility to free speech. Moreover, users can access to the uncensored information using its products. (Baker & Tang, 2015) To achieve this goal, the company supports to impose ethical standards on its service.

Google comes up with three steps for enhancing the transparency on its site. Firstly, it is to present clear notification for users on the results page if the search results are censored. Secondly, it is to make sure that users can know in advance if the sites they try to see are blocked. Third, it is to display links to the unfiltered Google.com. (Baker & Tang, 2015)

According to Google's testimony in 2010, it proposes that an increasing number of governments routinely censor the Internet. (Baker & Tang, 2015) In response to censorship problems, Google appeals for global solutions. As a matter of fact, Google used to passively respond to the investigations from U.S government. As pointed out by Baker and Tang, the company performs itself as a world leader in the ethical practices and requires the assistance from the U.S. government for seeking a global solution. Thus, it urges the U.S. government to figure out the issues associated with Internet openness. These issues contain the free flow of information, a significant part of foreign policy or trade, as well as development and human rights engagement. (Gugler & Shi, 2009)

To provide better services for local users and make the company more viable in the world, Google emphasizes that it is necessary to respect local laws and regulations. (Baker & Tang, 2015) Since different countries have different cultural, historical, and religious conditions, Google has to adapt its products and services to local conditions. As mentioned by Baker and Tang, the Google thinks highly of the localization of its products and the importance of enacting global standards for Internet freedom. This is because the company believes that global standards can preserve universal values including human rights and freedom of expression.

2.4 Review of Reddit

Reddit aggregates a variety source of social news. Furthermore, particular news will be classified into relevant subsections, which are known as subreddits. (Richterich, 2014) Even though the majority of Reddit users have never met each other, they can still share life experiences, give suggestions to each other and even send gifts to other users through this platform. Since 2005, Reddit has already become the most popular collaborative site for online news and online discussion. There are millions of unique visitors viewing this site every day. (Soha, 2012) As claimed by Soha, the numbers of visitors who see Reddit have reached one billion per month.

In December 2013, the number of registered users on Reddit reached 2,424,880 and 100,744,653 were unique visitors. (Richterich, 2014) As pointed out by Mills and Fish, almost 174 million users viewed this site in September 2014. Furthermore, Workman described that some Reddit's users had taken a survey from 2010 to 2011. According to their finding, the majority of site's users are male. Among them, white, young people occupy a large percentage of the total number, and those people currently live in the United States. (Mills & Fish, 2015) A recent Pew Research study found that the number of online adults who use Reddit occupies 6% of the total number. Additionally, males are twice as likely as females to search online. (Workman, 2014)

As a relatively new and popular site, Reddit replicates the business model from Digg and techie-related topics are more accessible on this site. (Soha, 2012) Reddit considers itself as "the front page of the Internet" and the company claims that Reddit displays a massive source of new and popular contents on its pages. (Anderson, 2015) Under multiple circumstances, certain information would appear on any other social media sites several days later after they become popular on Reddit. User ultimately uploads such information. Also, the membership determines the popularity of the information. Additionally, Reddit regards itself is a collaborative site and a "social news site" created through open-source software. (Olson & Neal, 2015)

Richterich points out that most of codes and libraries can freely access on Github under a Common Public Attribution License because Reddit is an Open Source Project. Users tend to submit their posts in the forms of text or hyperlink on this site. In spite of submitting posts, register users can also vote up or down other users' contribution (called upvotes and downvotes, respectively) by using the up/down voting buttons. (Richterich, 2014)(Workman, 2014) Additionally, they can comment on each post, and meanwhile other users can vote their comments. It is worth mentioning that the direct textual interaction on Reddit is not easy to achieve and it also rarely happens on subreddits with an only minority of subscribers. (Richterich, 2014)

One of the significant strengths of Reddit is its sense of community. There are always some subreddits displaying a variety of contents. (Van der Nagel, 2013) Even if there are not interesting topics, they can be easily created. Generally speaking, such subreddits

exist in some unique communities with the distinct cultures. The users will often feel pleased when their submitted posts or comments are upvoted. (Anderson, 2015)

As stated by Workman, Reddit consists of thousands of smaller communities which are known as subreddits. It is estimated that Reddit contains more than 240,000 "subreddits", also called content categories. However, 50 % of these "subreddits" are inactive and they receive less than five posts in total. (Mills & Fish, 2015) What is more, there are more than 144,000 active subreddits that users commonly subscribe. Reddit allows users to participate in interactions on some subreddits and aggregate all top posts from each subreddit. (Workman, 2014) Based on the content categories and page criteria of Reddit, they will commonly select the post.

Generally speaking, users are more likely to browse the posts from aggregated pages where they subscribe a set of subreddits. If users are not signed into their accounts, they will see the posts from the 'default' subreddits on the aggregated pages. As claimed by Mills and Fish, user could choose to browse posts from all subreddits or a particular subreddit. Users' selections about browsing posts from the primary page type are based on Reddit's 'Hot' ranking algorithm and their subscription of posts on subreddits will be identified as the highest ranks of posts by this algorithm. (Mills & Fish, 2015)

The front page is the mostly viewed page on Reddit, which displays the highest levels of posts from the subreddits that users subscribe. You will firstly see the front page with a variety of posts from subreddits when you access to Reddit.com. (Richterich, 2014) If users are not signed into their accounts, they will see the 'default front page'. It is worth mentioning that only high score of posts can appear on the front pages that require users browse and vote on individual posts. (Mills & Fish, 2015)

In the meantime, Reddit employs another algorithm on its page based on the age of submission. However, the majority of posts will not exist on the front page for more than 24 hours. This is because users' positive or negative vote to different links and posts will affect them consisting of the front page. However, to make some posts reach the front page, it requires enough positive votes and comments from users. (Soha, 2012)

Digg is Reddit's predecessor and it used to be the most active Social News site. (Mills & Fish, 2015) According to the predication of Mills and Fish, the Social News site like Digg might confront with problems of censorship. Freedom of speech has always been a fundamental principle of user communities. The front pages of Reddit are much different from any other social network sites. To be specific, the company has been moderating the page content by itself, while the moderation of subreddits is largely left to the user community. (Flew, 2015) However, user community does not always succeed in the moderation of subreddits. (Anderson, 2015)

When it comes to the Reddit community, users' discussions and comments on such site not only focus on political topics. Reddit consists of various "subreddits" that devote to

a wide diversity of topics. Some subreddits have very general topics such as Texas, while some of them are very specific, such as homosexual that displays gay and lesbian video. (Workman, 2014) Reddit is becoming a popular site for political discussion as increasingly numbers of young people are especially keen to political news and debate on this site. (Soha, 2012) In consequence, it also turns into one of the radical sites because it allows dissenting opinions although some of them may be illegal.

It seems like that Reddit fails to consider the fact that the cause of some issues is discounting or ignoring censorship on users' posts. For example, Reddit fails to censor illicit images and NSFW subreddits (not safe for work). (Soha, 2012) Today, there are still many subreddits involving in a discussion on pornographic and any other sexual topics.

As pointed out by Workman, Reddit begins to ban certain subreddits which promote child pornography because it has received more and more criticisms along with its popularity. For instance, someone accuses that there is the "anti-women" content existing in a subreddit called TwoXChromosomes. (Workman, 2014) In response to these "anti-women" content, some of the users submit their posts for denouncing this speech and comment on each post successively. Also, some Reddit users try to identify the person who causes Boston Marathon Bombing, they share the information retrieved from multiple social media sites on the subreddit "FindBostonBombers". Also, they will share related information from police scanner and individual's unofficial report.

During the Boston manhunt, there is too much related information available on Reddit even it makes authorities surprised. (Anderson, 2015) Among the information, some of them are inaccurate. As a result, Reddit community identifies an innocent individual. Finally, Reddit administrators have to shut down this subreddit and apologize to the victim and his family. When it comes to Reddit's actual rule, it only restricts users in certain behaviors, such as posting spam messages, canvassing activities, and posting personal information, child pornography and any other sexual contents. The rules do not refer to the limitation on an offensive material which is commonly known as being unsafe for work (NSFW). (Massanari, 2015) Because NSFW content includes both loose moderation and the support of free speech, it is hard for Reddit to regulate offensive content.

Some users emphasize the process of interacting with other users on Reddit, while others post content for merely collecting 'Karma-points'. The second approach is called 'Karmawhoring', and the collection of Karma-points on each post will be allocated by Reddit's ranking and evaluation system. Users' contribution's value on Reddit can be presented in the forms of Karma-points and their upvotes and downvotes calculate the Karma-points. However, individual posts, which receive more Karma-points, do not mean that they have good content quality. (Richterich, 2014)

Karma-points have been criticized by users because they seem to inhibit innovative content. (Richterich, 2014) In consequence, users' enthusiasm to contribute with posts has been reduced because they are more willing to vote or comment on previous posts

rather than post their contents. Meanwhile, lower-quality content is increasing on Reddit.

The direct censorship of Reddit is usually the top-down strategies executed by moderators to warn users for deleting content and ban certain users who break their rules.(Massanari, 2015) As stated by Richterich, some examples of Karmawhoring are controversial or they are simply involved in the meta-discussions, yet these cases of Karmawhoring posts might be enforced deletion. In general, users can see the official statements about moderators' intervention if there are problems within their posts. For instance, a moderator once found that some users manipulated votes on a post or comment in an e-sports subreddit. (Richterich, 2014) The moderator had to execute official interference on vote-cheating and ultimately encountered the responses to the negative enforcement from users.

2.5 Review of Imgur

In 2009, Imgur was founded by a Reddit user, Alan Schaaf, for the purpose of helping users host images on Reddit. (Diakov, 2015) Compared to any other social media sites full of skilled and political content, the majority of topics hosted on Imgur are social and entertainment content. (Mikal et al., 2015) Millions of unique users upload billions of contents on this site, which can be personal stories, memes, and photos. Through a voting process, they recommend their best content to other users. However, the majority of users can just view the content that has been heavily upvoted. Some experts describe it as the "social navigation". (Sandvig, 2015)

As described by Mikal, Imgur had received 45,995 visits each month and the average time of each visit would only cost 49 seconds in February 2009. Every day, it can receive almost 1.4 billion page views. The average of unique visitors on Imgur reaches 47.6 million per month, and they spend 11 minutes on each visit. Besides, most of them are male who occupies 83% of the total number. There are 71% of users under 35 years old. As mentioned by Walther and Jang, Imgur provides three types of online messages, including proprietor content, user-generated content and aggregate user representations. (Mikal et al., 2015) The first one refers to user-generated original image and comment; the second one refers to comments on other users' content, and the third one is related to ratings.

Since 2009, Imgur.com (pronounced imager) has become a new approach to share photos, images, and gif. (Mikal et al., 2015) Graphical Interchange Format, typically known as gif, allows both static and animated images. Notably, 'gif' is also compatible with sound online. In the beginning, Imgur is a platform for users to upload and share images on the Internet. By merely proving web links, users can share images online.

The site creator Alan Schaaf describes Imgur as a YouTube for hosting images. Indeed, all the images can be uploaded and saved in a "user submitted" gallery on Imgur. (Mikal et al., 2015) As pointed out by Mikal, the Members are capable of "like" the site

content, posting original images with specified size and commenting on other users' images. However, the "pro" members can post original content without size restrictions. Even a nonmember can lurk and view the content on Imgur.

According to some previous studies, Imgur has some non-community design features that may bring potential harms. (Mikal et al., 2015) First of all, the site had only been used for hosting images since 2009. Until November 2010, users can comment on others' content. Hence, the concept of Imgur community does not exist until it is launched on site 18 months later.

Secondly, the notion of a critical mass represents both an adequate and a manageable group of participants. (Mikal et al., 2015) Since there are increasing numbers of users on social network sites, certain sites such as Facebook, Twitter, and Reddit choose to encourage the formation of smaller interest-driven communities with more intimate. However, Imgur fails to divide visitors into smaller sub-Imgur communities. Therefore, massive of users post a broad range of topics, which lead to the confusion and overwhelm on this site.

Thirdly, it is very easy to sign up and apply an account on Imgur. Some users even have more than one account with different names. Hence, they can easily disappear and sign up for another account or directly alter a different account name which may thereby reduce the sense of community. (Mikal et al., 2015)

Fourthly, Mikal described that more than 60% of the traffic on Imgur are the links retrieved from other online resources, such as Facebook, Twitter and Reddit. Compared to any other online discussion boards, Imgur has a large size and multiple access points. Also, only a few core members dominate the site content. As a result, users cannot know each other in personal terms because it loses its sense of community. (Mikal et al., 2015)

Fifthly, Mikal stated that users have no need to "follow" other users on Imgur because all the information on this site is public and everyone can view them without accounts. Sixthly, Imgur rarely restricts the posting content. In consequence, Imgur seems to fail to consider the definition of subjective and amorphous off-topic post, which often causes users' contention and confusion, even though users' up or down votes can adjudicate off-topic post. (Mikal et al., 2015)

Seventhly, users are identified by real name on Facebook, while users on Imgur generally use avatars and pseudonyms. (Mikal et al., 2015) Thus, it can cause serious problems on Imgur. Participants usually feel some sense of identification and lose individuation on this site. However, it does not mean self-censoring their communication. This is because of Imgur's design features (large size, anonymity, low barriers to entry and exit). Imgur intends to create a balance between individual and the community.

A few users have ever complained that some images hosted on Reddit violate the

copyright law. Meanwhile, it encourages copyright infringement by enforcing users to host these images on Imgur. Images hosted on Imgur brings advertising revenue for Reddit, while this site does not provide copyright protection for images and even blame them to the original creator. (Diakov, 2015) As a matter of fact, the sites like Imgur and Reddit stresses humorous captioning of visual material and they rarely concern about censorship and propriety.

Generally speaking, these sites are only used for a variety of images which can be captioned. (LLoyd, 2014) In consequence, some governments begin to worry about that the information on this site will pose adverse impact on their citizens. Moreover, Indonesian government even blocks Imgur and Reddit because they are worried about nudity on the sites. (Mantelero, 2014)

Chapter 3: Methodology

3.1 Data collection

This research extends previous studies on exploring censorship from five leading social network sites (e.g. Facebook, Twitter, Google, Reddit and Imgur). The paper chose five sites to explore censorship because of their market popularity. Also, it selected thousands of censorship data by searching approximately hundreds of sensitive keywords on the SNSs. Further, it recorded the results of whether these keywords were blocked or not.

To collect censorship data from different countries, this research used free VPN to connect with the Internet from those countries outside of New Zealand (United States, Russia, Japan and South Korea). Among these countries, some of them implemented strict policies on social network sites, while others did not focus on this area. By exploring censorship of these five countries, this research could testify whether the censorship of these countries had actually been implemented as they announced. Additionally, different test data were utilized for collecting censorship data from five SNSs because each site has different characteristics. After utilizing the same test data on Twitter, Reddit and Imgur, this study aggregated censorship data separately for each site and then aggregated censorship data on comparative analysis among three SNSs (Twitter, Reddit and Imgur).

3.1.1 Data collection from Facebook

To collect censorship from Facebook, it is essential to measure the status of top 300 porn sites blocked on Facebook chatting session. In general, users will receive warnings from Facebook if they send messages with information on the blacklist. To measure the censorship of Facebook, this study recorded of whether Facebook blocks each porn site in its chatting session.

3.1.2 Data collection from Google

To collect censorship data from Google, a list of sensitive keywords were utilized for measuring censorship on five country-specific versions of Google. These keywords had been added to the blacklist of Google. This test aims to verify whether these keywords are blocked by five country-specific versions of Google. Thus, the results of this test are the record of a list of blocked or unblocked keywords on five country-specific versions of Google.

3.1.3 Data collection from Twitter

It is more complicated to collect the censorship data from Twitter. To be specific, hundreds of sensitive keywords were utilized as the testing data on Twitter. The test data had eight types of sensitive keywords and the number of them reached 392. Users shall be cautious about using these keywords online if they do not want the government spying on them. (MILLER, 2012) Furthermore, this research collected censorship data from Twitter by searching these keywords on Twitter and then recorded whether they have searching results.

3.1.4 Data collection from Reddit

The same method was used for collecting the censorship data on Reddit. In this test, it searched the same test data (i.e. 392 sensitive keywords) on Reddit for exploring censorship. The aim of this test is to verify whether Reddit blocks such posts or subreddits related to these keywords. Also, the results of this test were recorded.

3.1.5 Data collection from Imgur

To collect the censorship data from Imgur, this research not only utilized the same test data (i.e. 392 sensitive keywords) but also adopted the same method. Additionally, certain keywords were regarded as the blocked information on Imgur if searching results could not be got. Finally, this study recorded the whole blocked and unblocked keywords on Imgur.

3.2 Measurement

In this thesis, censorship data was recorded into some tables for describing whether each SNSs blocked certain keywords. Besides, the frequency chart was utilized for analyzing the data, and it would be the percentage of certain blocked sensitive information. This research aims at censoring on users' chatting session or users' posts and comments on each SNSs. Also, a list of table was utilized to illustrate censorship of five social network sites as well as their implementation in different countries.

3.3 Limitation of data collection

The simplest approach to explore censorship on social network sites is using keywords searching. This method is not only easy and fast but also can accurately seek out the blocked information by examining various keywords on each SNSs. It also seldom generates errors, because accurate information on SNSs can be got by using the search box on the front pages. Notably, there is uncertainty to capture all the blocked information

using this method, because it has limitations in collecting such kind of data.

In this thesis, it has been confirmed that collecting such kind of data is suitable for Facebook and Google. The researchers have received warnings from sites when searching sensitive keywords on country-specific versions of Google and sending test data on Facebook chatting session. However, this approach may not be suitable for verifying censorship on Twitter, Reddit and Imgur. Sometimes, the researchers can hardly verify censorship of sensitive keywords on social network sites when getting "0" searching results, because it is unknown whether the results have been officially removed.

Chapter 4: Results

4.1 Measurement of Facebook censorship

To measure censorship on Facebook, this research utilized top 300 porn sites as the test data. In the testing process, 316 porn sites in Facebook chatting session had been examined. Among these porn sites, only 59 of them were blocked in Facebook chatting session. Table1 records all the blocked porn sites in Facebook chatting session.

Table 1: List of blocked porn sites on Facebook

List of blocked porn sites on Facebook		
motherless.com	lesbianpornvideos.com	homesexdaily.com
sunporno.com	eroxia.com	free2peek.com
alphaporno.com	iyottube.com	vankoi.com
yobt.com	yourfreeporn.us	tubethumbs.com
pornsharia.com	sexoasis.com	maxjizztube.com
slutload.com	pornjog.com	PornTelecast.com
xxxbunker.com	pornupload.com	sexfans.org
pornhost.com	kosimak.com	koostube.com
fux.com	lubeyourtube.com	amateursex.com
kporno.com	141tube.com	cantoot.com
secret.shooshtime.com	my18tube.com	sextube.si
mofosex.com	afunnysite.com	xfanny.com
userporn.com	megaporn.com	sex2ube.com
jizzonline.com	adultvideodump.com	adultvideomate.com
pornotube.com	silverdaddiestube.com	porntubesurf.com
pornative.com	xfapzap.com	darkpost.com
boysfood.com	dirtydirtyangels.com	xxxpornow.com
lubetube.com	bigerotica.com	specialtytubeporn.com
al4a.com	isharemybitch.com	public‑sluts.net
jizzbo.com	thegootube.com	

Figure 1: Percentage of blocked porn sites on Facebook
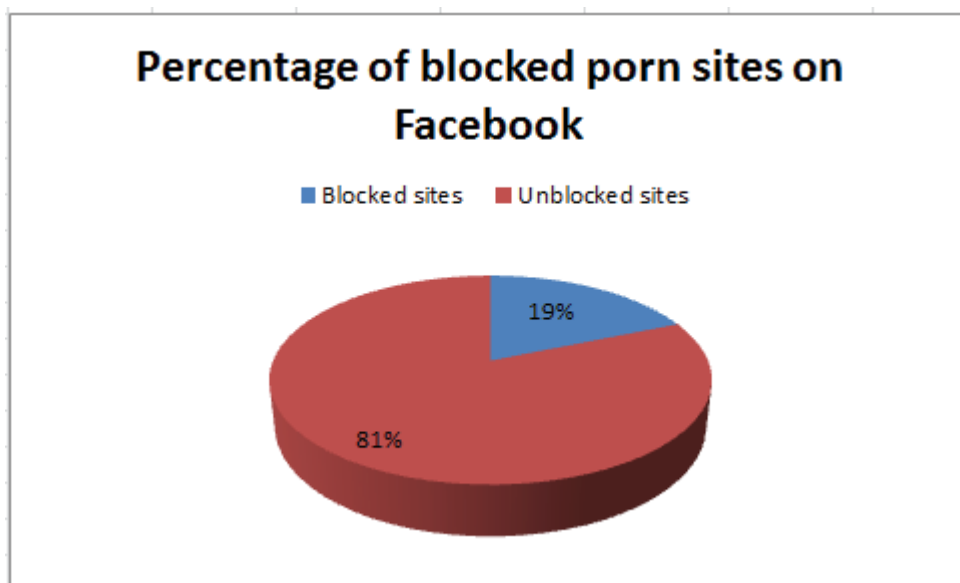
Total: 316 porn sites
Blocked porn sites: 19% (59/316*100%)

Figure 1 shows the percentage of blocked porn sites in Facebook chatting session, and it occupies 19% of total number.

4.2 Measurement of Google censorship

Google has country-specific versions. To measure Google censorship, it requires the censorship data from various countries. Five countries, including New Zealand, United States, Russia, Japan and South Korea, were chosen as the research objects. Also, the free VPN was adopted to connect the Internet outside of New Zealand for collecting censorship data from these countries.

The primary purpose of this test is to discover the blocked information on different country-specific versions of Google. It has been thought that Google possesses two types of censoring activities on keywords. First of all, it has no keywords suggestions available when people search for any keywords on Google. Secondly, it has keywords suggestions but people cannot access to them. Thus, 441 keywords were utilized as the test data in this test, and all of these words had been added to the blacklist on Google.

However, the results of this test are surprising. Even though these vocabularies had been identified as the sensitive keywords on Google, none of them were blocked by New Zealand, United States, Russia and Japan. Only South Korea blocked 31 of these sensitive keywords. People can still see the keywords suggestions by searching them on Google Korea. However, they cannot access to any of them. The following table recorded the blocked keywords in Google Korea.

Table 2: List of blocked sensitive keywords in Google Korea

List of blocked sensitive keywords in Google Korea		
asian babe	black coCk	cuckoLd
autoerotiC	blonde actIon	deep thRoat
ball kiCking	blonde on blonde aCtion	deeptHroat
ball liCking	brunette Action	dilDo
ball sUcking	bukKake	double donG
bangBros	bustY	double pEnetration
barebAck	camslUt	dp acTion
bbW	clit	eat my Ass
beaver lipS	courtney troUble	electrotorTure
big knOckers	cream ple	fantasieS
big tiTs		

Figure 2: Frequency distribution of blocked keywords on five country-specific of Google
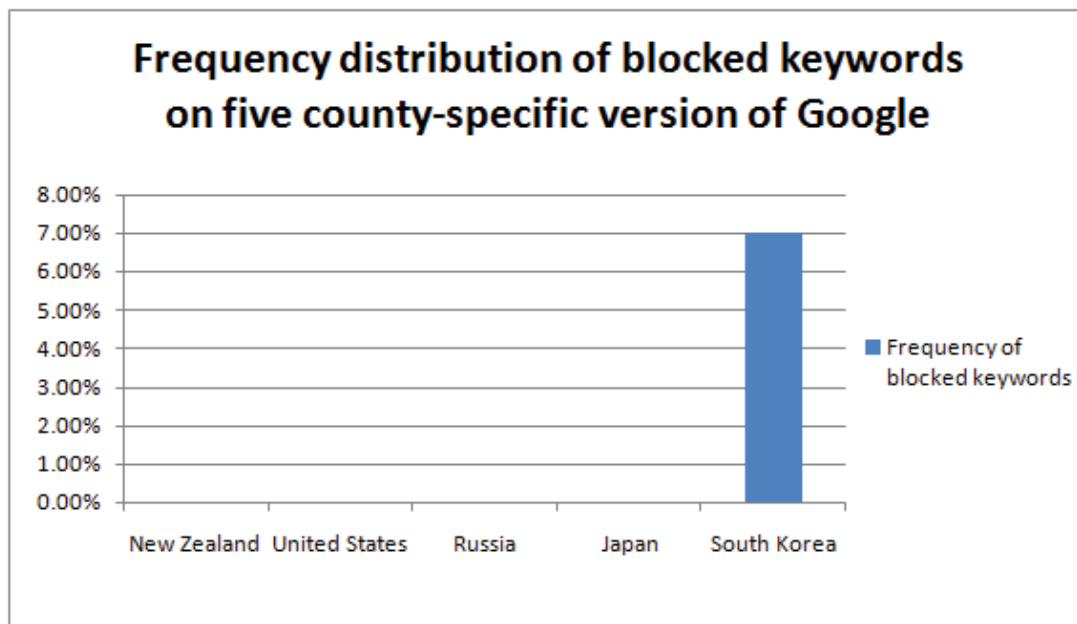
Total: 441 sensitive keywords
Blocked keywords in South Korea: 7% (31/441*100%)

As shown in Figure 2, none of the keywords have been blocked by New Zealand, United States, Russia and Japan. Only South Korea blocked 31 keywords, and it occupies 7% of the test data.

4.3 Measurement of Imgur censorship

Imgur is the site for hosting images. To explore censorship on Imgur, this research also collected censorship data from New Zealand, United States, Russia, Japan and South Korea. Thus, the free VPN was used for collecting the censorship data from countries outside of New Zealand.

In the testing process, this research utilized 392 sensitive keywords with different categories for the measuring censorship on Imgur. The researchers thought that they could not find any hosting images if searching for blocked keywords on Imgur. Finally, the researchers discovered that these five countries had blocked the same 73 keywords on Imgur. These blocked keywords occupy 18.62% of the total number. The following table recorded all the blocked keywords on Imgur.

Table 3: List of blocked keywords on Imgur with categories

Categories	keywords	keywords
Domestic Security	Maritime domain awareness	National preparedness
	National preparedness	Disaster medical assistance
	Disaster assistance	team (DMAT)
	DNDO(Domestic Nuclear Detection Office)	Domestic nuclear detection
	Bomb(squad or threat)	Organize crime
Pornography	18onlygirls	ktr
	czechav	rarbg
	czechcasting	twistys
Cyber Security	DDOS(dedicated denial of service)	Mysql injection
	Conficker, Rootkit	Cyber terror
	Brute forcing	
Weather/Disaster/Emergency	Mud slide or Mudslide	Tsunami Warning Center
	Stranded/Stuck	
Terrorism	IED(Improvised Explosive Device)	ETA(Euskadi ta Askatasuna)
	Al Qaeda(all spelling)	Basque Separatists
	AQIM(Al Qaeda in the Islamic Maghred)	Eco terrorism
	FARC(Armed Revolutionary Forces Colombia)	Conventional weapon
	IRA(Irish Reputation Army)	PLF(Palestine Liberation Organization)
	TTP(Tehrik-i-Taliban Pakistan)	

	Airplane (and derivatives)	Cartel Methamphetamine
	CIKR (Critical Infrastructure & Key Resources)	Smuggling (smugglers)
	Failure or outage	Cartel de Golfo
	Computer infrastructure	Gulf Cartel
	NBIC(National Biosurveillance Integration Center)	Michoacana
	Transport security	Arellano-Felix
Infrastructure Security	Service disruption	Torreon
	Southwest Border Violence	Beltran-Leyva
	Ciudad Juarez, Kidnap	Barrio Azteca
	Reyosa	Narco banners(Spanish equivalents)
	Mara salvatrucha	Artistic Assassins
	Tamaulipas	Mexicles, U.S
	MS13 or MS-13	
HAZMAT & Nuclear	Biological infection (or event)	Suspicious package/device
	Suspicious package/device	Nerve agent
	Blister agent	Hazardous material incident
Health Concern + H1N1	Center for Disease Control (CDC)	Agro Terror
	Foot and Month (FMD)	Norvo Virus
	Water/air borne	Viral Hemorrhagic Fever
	H5N1	

As displayed in the following table, Imgur blocks eight categories of blocked keywords, which include Domestic Security, Pornography, Cyber Security, Weather/Disaster/Emergency, Terrorism, Infrastructure Security, HAZMAT & Nuclear and Health Concern + H1 N1. Among these blocked keywords, Infrastructure Security has the highest rate of blocked keywords. Furthermore, the number of such blocked keywords reached twenty-five, and it occupies 26.04% of its categories. Additionally, terrorism has the second highest rate. Moreover, there are eleven blocked keywords that belong to Terrorism, which occupies 22% of its category.

Cyber security has the third highest rate. There are five blocked keywords that belong to cyber security, and it occupies 20.83% of its category. Domestic security has the fourth highest rate. There are ten blocked keywords belonging to domestic security and it occupies 19.23% of its category. HAZMAT & Nuclear has the fifth highest rate. There are six blocked keywords belonging to HAZMAT & Nuclear and it occupies 17.14% of its category. Health Concern + H1N1 have the sixth highest rate. There are seven blocked keywords belonging to Health Concern + H1N1, and it occupies 14.29% of its category.

Pornography has the seventh highest rate. There are six blocked keywords belonging to pornography and it occupies 12.77% of its category. However, the lowest rate of blocked keywords is Weather/Disaster/Emergency. There are just three keywords that have been blocked and it occupies 7.69% of its category.

Table 4: Statistics of blocked keywords on Imgur

Categories	Blocked by New Zealand	Blocked by United States	Blocked by Russia	Blocked by Japan	Blocked by South Korean	Volume of blocked keywords	Frequency
Domestic Security	10	10	10	10	10	52	19.23%
Pornography	6	6	6	6	6	47	12.77%
Cyber Security	5	5	5	5	5	24	20.83%
Whether/Disaster/Emergency	3	3	3	3	3	39	7.69%
Terrorism	11	11	11	11	11	50	22.00%
Infrastructure Security	25	25	25	25	25	96	26.04%
HAZMAT & Nuclear	6	6	6	6	6	35	17.14%
Health Concern + H1N1	7	7	7	7	7	49	14.29%
Total	73	73	73	73	73	392	18.62%

Figure 3: Frequency distribution of blocked keywords on Imgur
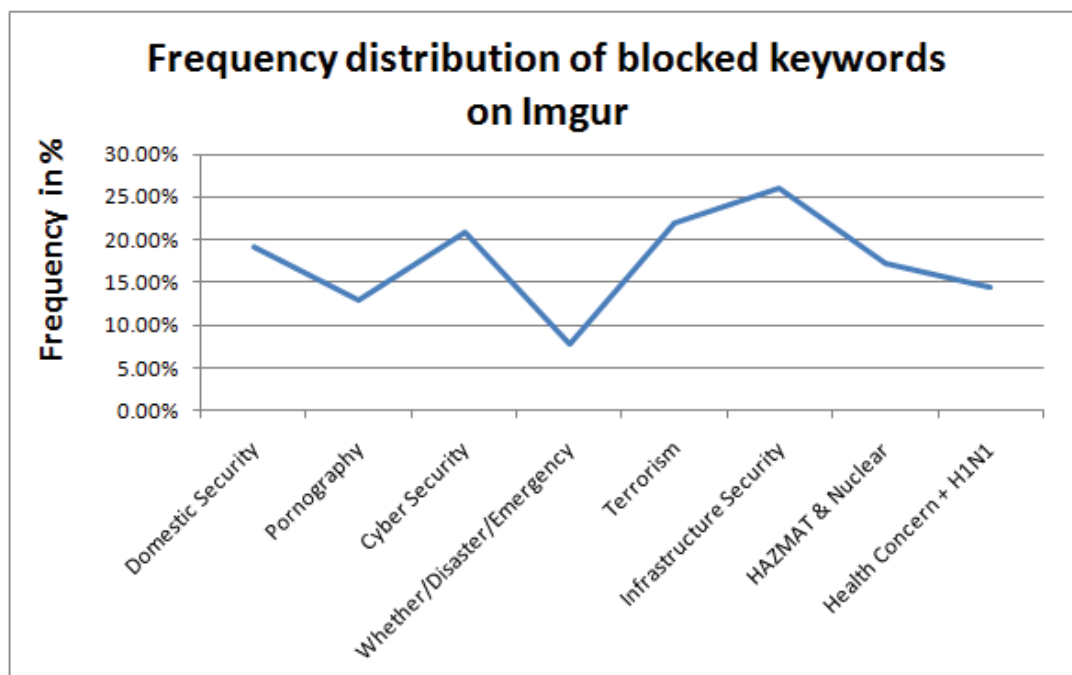
As shown in Figure 3, those keywords belong to Infrastructure Security, which has the highest rate of being blocked by Imgur. However, Imgur has rarely blocked some keywords that belong to Weather/Disaster/Emergency.

4.4 Measurement of Reddit censorship

Reddit censorship is entirely different from any other social network sites, and it always involves censoring or blocking activities in a particular subreddit. Hence, it is difficult to find out the blocked information on Reddit. In the testing process, this research used the same test data (i.e. 392 sensitive keywords), which have been utilized in Imgur, for conducting this test. In Reddit, the keywords suggestions on the front page are the posts of some subreddits and users.

This test aims to discover the blocked subreddits and blocked posts by searching those 392 sensitive keywords on Reddit. To measure censorship on Reddit, this research collected censorship data from five countries (e.g. New Zealand, United States, Russia, Japan and South Korea). Surprisingly, none of these keywords have been blocked by these countries on Reddit.

Table 5: Statistics of blocked keywords on Reddit

Categories	Blocked by New Zealand	Blocked by the United States	Blocked by Russia	Blocked by Japan	Blocked by South Korean	Volume of blocked keywords	Frequency
Domestic Security	0	0	0	0	0	52	0.00%
Pornography	0	0	0	0	0	47	0.00%
Cyber Security	0	0	0	0	0	24	0.00%
Whether/Disaster/Emergency	0	0	0	0	0	39	0.00%
Terrorism	0	0	0	0	0	50	0.00%
Infrastructure Security	0	0	0	0	0	96	0.00%
HAZMAT & Nuclear	0	0	0	0	0	35	0.00%
Health Concern + H1N1	0	0	0	0	0	49	0.00%
Total	0	0	0	0	0	392	0.00%

Total: 392 sensitive keywords

Blocked keywords on Reddit: 0% (0/392*100%)

4.5 Measurement of Twitter censorship

To measure censorship on Twitter, this research applied the same test data (i.e. 392 sensitive keywords), which have been utilized in Imgur and Reddit, for carrying out this test. Like the measurement on Reddit and Imgur, the censorship data on Twitter was collected from five different countries, such as New Zealand, United States, Russia, Japan and South Korea. In fact, merely one sensitive keyword was blocked by five countries, namely IRA (Irish Reputation Army). This keyword belongs to terrorism. Thus, a conclusion can be reached: the frequency of blocked keywords on Twitter is 0.26%, and the blocked keywords occupy 2% of Terrorism words.

**Table 6: Statistics of blocked keywords on Twitter**

Categories	Blocked by New Zealand	Blocked by the United States	Blocked by Russia	Blocked by Japan	Blocked by South Korean	Volume of blocked keywords	Frequency
Domestic Security	0	0	0	0	0	52	0.00%

Pornography	0	0	0	0	0	47	0.00%
Cyber Security	0	0	0	0	0	24	0.00%
Whether/Disaster/ Emergency	0	0	0	0	0	39	0.00%
Terrorism	1	1	1	1	1	50	2.00%
Infrastructure Security	0	0	0	0	0	96	0.00%
HAZMAT & Nuclear	0	0	0	0	0	35	0.00%
Health Concern + H1N1	0	0	0	0	0	49	0.00%
Total	1	1	1	1	1	392	0.26%

Total: 392 sensitive keywords

Blocked keywords on Twitter: 0.26% (1/392*100%)

Figure 4: Frequency distribution of blocked keywords on Twitter
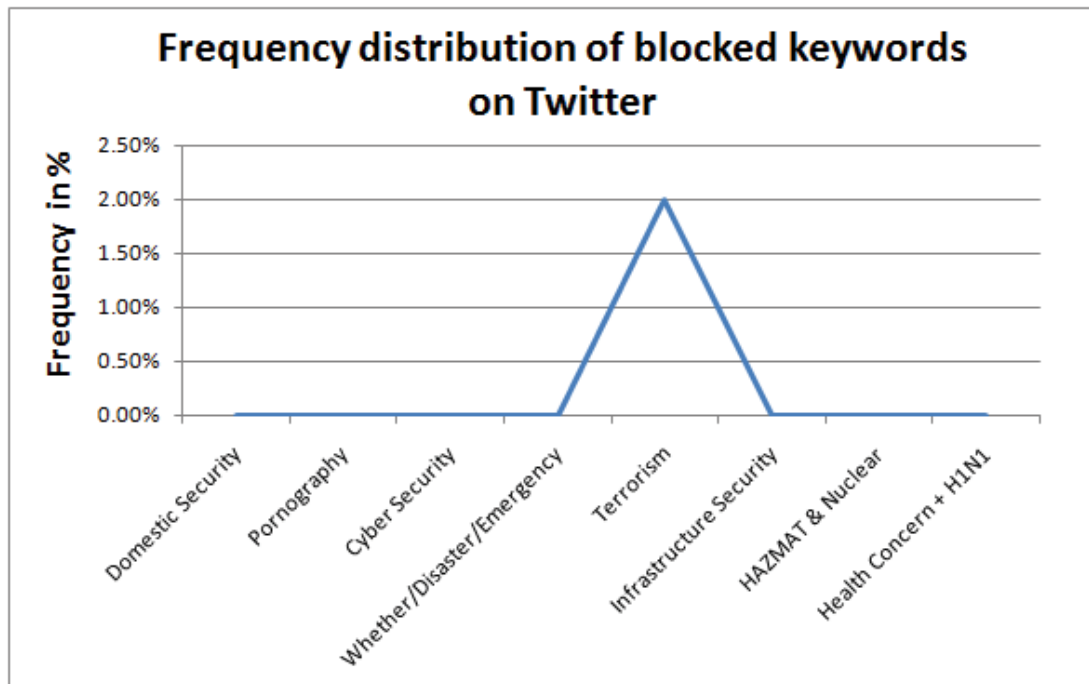
Total: 50 terrorism keywords

Blocked keywords on Twitter: 2% (1/50*100%)

As displayed in Figure 4, 2% of terrorism words were blocked by Twitter, while Twitter did not block any other keywords.

4.6 Comparative analysis of three social network sites

4.6.1 Comparative analysis of blocked keywords

It is worthwhile to make comparative analysis on Imgur, Reddit and Twitter, because the same test data (i.e. 392 sensitive keywords) was utilized to measure the censorship on these three sites. According to the statistics, Imgur has the highest frequency of blocking activities. Specifically, there are 73 keywords being blocked by Imgur and the frequency of these words reaches 18.62%. However, there is only one sensitive keyword being blocked by Twitter, and it occupies 0.26% of test data. Reddit blocks none of the keywords in the test data, and its frequency is 0%.

Figure 5: Comparison of frequency distribution between Imgur, Reddit and Twitter
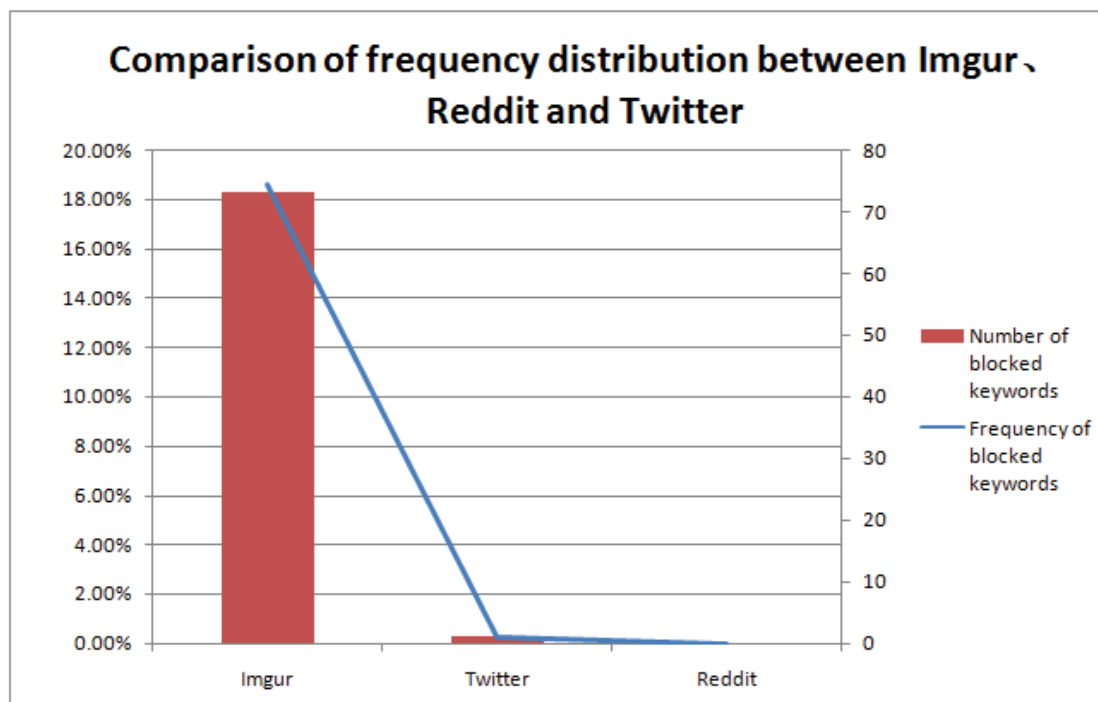
As shown in Figure 5, Imgur has the highest rate of the blocked keywords; Twitter has the second-highest rate of the blocked keywords; Reddit blocks none of the keywords in the test data.

4.6.2 Comparative analysis of types of blocked keywords

Table 7: Comparative analysis of types of blocked keywords

Categories	Volume of blocked keywords	Blocked by Imgur	Blocked by Twitter	Blocked by Reddit	Percent
Domestic Security	52	10	0	0	13.7%

Pornography	47	6	0	0	8.2%
Cyber Security	24	5	0	0	6.8%
Whether/Disaster/Emergency	39	3	0	0	4.1%
Terrorism	50	11	1	0	15.07%
Infrastructure Security	96	25	0	0	34.25%
HAZMAT & Nuclear	35	6	0	0	8.2%
Health Concern + H1N1	49	7	0	0	9.6%
Total	392	73	1	0	100%

As displayed in this table, there are 73 keywords having been blocked by these social network sites, and it occupies 18.6% of the test data. Regarding the test data, these three SNSs block more or less in eight types of keywords. Among these keywords, 13.7% of them belong to Domestic Security and 8.2% of them belong to pornography. There are 6.8% of them belonging to Cyber Security as well as 4.1% of them belonging to Weather/Disaster/Emergency.

There are 15.07% of blocked keywords that belong to Terrorism. The frequency of blocked keywords, which belongs to Infrastructure Security, has reached 34.25%. There are only 8.2% of blocked keywords belonging to HAZMAT & Nuclear and 9.6% of them belonging to Health Concern + H1N1. To sum up, Imgur blocked all of these 73 keywords, Twitter only blocked one keyword that belongs to Terrorism, while Reddit blocked none of these keywords.

Figure 6: Comparison of frequency distribution between Imgur, Reddit and Twitter on the type of keywords
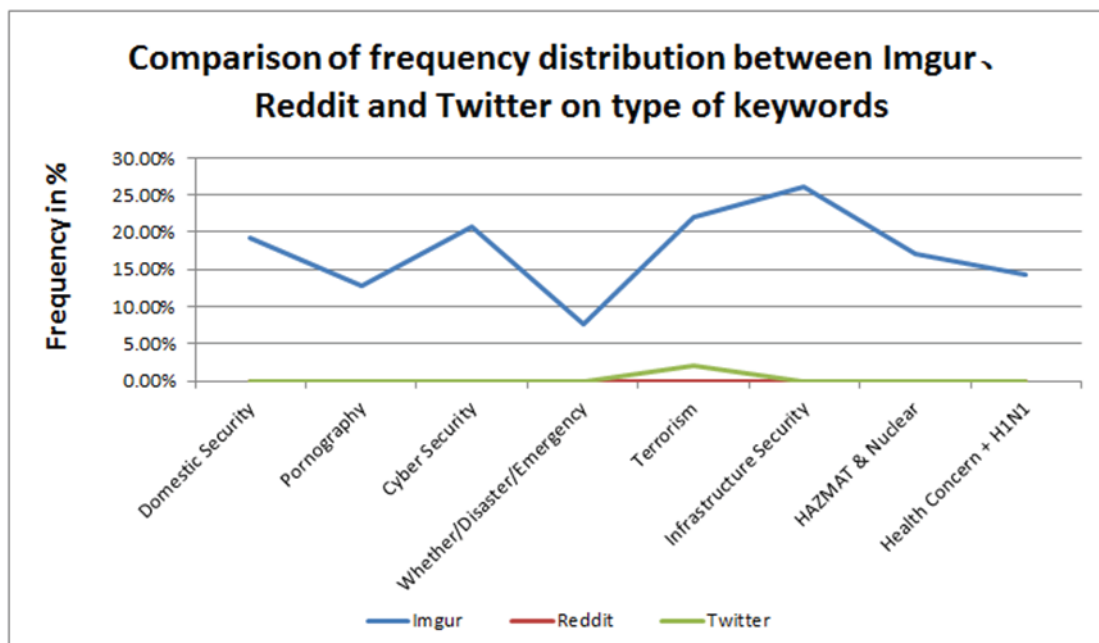
As shown in Figure 6, Imgur blocked eight categories of these keywords, while Twitter only blocked the keywords in Terrorism. Furthermore, Reddit blocked none of the keywords in the test data.

Table 8: Statistical results across five networks based on countries

	Facebook	Twitter	Google	Reddit	Imgur
New Zealand	19%	0.26%	0%	0%	18.62%
United States	19%	0.26%	0%	0%	18.62%
Russia	19%	0.26%	0%	0%	18.62%
Japan	19%	0.26%	0%	0%	18.62%
South Korea	19%	0.26%	7%	0%	18.62%
Total	19%	0.26%	1.4%	0%	18.62%

As displayed in Table 8, New Zealand, United States, Russia and Japan implement the same levels of content filtering on each social network site. However, only South Korea has censoring activities on Google. Thus, the conclusion can be reached: South Korea emphasizes censorship on these five social network sites.

Table 9: Statistical results across five networks based on content categories

	Political expression	Pornography	Personal information	Hot topics
Facebook	0%	19%	0%	0%
Twitter	2%	0%	0%	0%
Google	0%	7%	0%	0%
Reddit	0%	0%	0%	0%
Imgur	44%	12.77%	0%	0%

To explore the research questions, this research has classified the content related to Domestic Security, Terrorism and Infrastructure Security as the political expression on social network sites. Also, it defined the highest frequency of blocked content in the test as the most frequently censored content in this thesis. According to the statistical results shown in Table 9, the blocked content on Imgur occupies 44% of total number, and such kind of content is the most frequently censored content in the test data.

Chapter 5: Discussion and conclusion

5.1 Discussion

This chapter will re-examine the results discussed above and attempt to link back to the research questions and hypotheses. As suggested by some previous studies, Facebook censors some content which violates any of its "Community Standards". These could be part of users' political opinions, nudity, violence content, human-right abuses, homosexual content, and advertisement. Also, Facebook censors website links and any other external information posted on the Facebook. (Sirichit, 2015)

As suggested in this research, the previous studies only mentioned that the Facebook censors users' posts and comments. However, they fail to mention censorship on users' private conversation. To explore Facebook censorship, this research measures 316 porn sites that are blocked in Facebook chatting session. According to the results, there are 59 of them being blocked in Facebook chatting session and it occupies 19% of the total number. Also, it confirms that censorship exists in users' private conversation. Unfortunately, this research cannot confirm the **H1:** Private conversation will get more censorship more than posts.

As is well known, Twitter forbids hate speech. (Ammori, 2014) As indicated by some previous studies, Twitter aims at preventing users who are involved in spam and fraud. (Newland et al., 2011) Users' accounts are deleted by Twitter because they send too much spam. Recently, Twitter has begun to censor revenge porn and further censor any expressions which may promote terrorism or racism. (Petrovic et al., 2013) It is worth mentioning that Twitter supports national-level censorship requests in country-specific.

To explore censorship on Twitter, this research used different types of keywords (i.e. 392 sensitive keywords), which were also employed in Imgur and Reddit, for conducting the test. To confirm that Twitter supports censorship in country-specific, the censorship data was collected from five different countries (New Zealand, United States, Russia, Japan and South Korea). Surprisingly, the censorship of Twitter is weaker than people anticipate. There is only one sensitive keyword being blocked by five countries, which is IRA (Irish Reputation Army). IRA (Irish Reputation Army) is a sensitive political word. Thus, this research can confirm the **H2:** Some sensitive political words will be censored.

Google implements its censorship on "country-specific" versions of Google. However, it usually censors any content that violates US Digital Millennium Copyright Act. (Cobia, 2008) Also, Google implements its censorship through informal approval requests for content removal, and these requests are usually required from countries for removing political content or terrorism on its search results. (Rushe, 2012) To explore censorship on the "country-specific" versions of Google, the censorship data was collected from New

Zealand, United States, Russia, Japan and South Korea. Furthermore, 441 keywords were utilized as the test data in this test. All of these words have been defined as the sensitive keywords on Google. There are only 31 of these sensitive keywords being blocked by South Korea. Notably, none of any keywords is blocked by any other countries.

This research can confirm the **H3:** Some keywords related to pornography will probably be censored on each site. From this test, it can be found that Google implements different censorship on its "country-specific" versions and Google Korea censors more keywords than any other countries. Hence, this research can confirm the **H4:** South Korea will censor more information than any other countries and **H5:** Other countries will not censor much of keywords in the test data.

Censorship of Reddit often involves blocking activities on certain subreddits which have already caused harm and received criticisms. (Workman, 2014) In general, Reddit restricts users in certain behaviors, such as posting spam messages, canvassing activities, posting personal information, and posting child pornography as well as any other sexual content. (Anderson, 2015) Also, Reddit is enforced to censor some cases of 'Karmawhoring' (collections of Karma-points on some posts) because certain posts do not have good content quality. To explore censorship of Reddit, this research used the identical 392 sensitive keywords, which have been utilized on Imgur and Twitter, for carrying out this test. The censorship data of Reddit comes from five different countries including New Zealand, United States, Russia, Japan and South Korea. However, these five countries have blocked none of these keywords. As suggested by this research, Reddit only bans certain subreddits or posts that have caused harms, and they will not censor information that is accurate to the keywords.

According to previous studies, Imgur and Reddit emphasize humorous captioning of visual materials and they rarely show concern about censorship and propriety. (LLoyd, 2014) Some governments censor Imgur for fear of its inappropriate images hosted on the site. For instance, Indonesia government blocks Imgur because they are worried about nudity on the site. (Mantelero, 2014) To explore censorship on Imgur, this research adopted the same test data which have been applied in the test on Twitter and Reddit. Among 392 sensitive keywords, only 73 of them are blocked by Imgur in five countries. It can imagine that these blocked keywords may be associated with inappropriate images and they should not exist on Imgur.

However, it is impossible to confirm **H6:** social network site frequently censors those keywords in relation to personal information as well as **H7:** keywords in relation to hot topics will be censored more. Due to the limitation of the test data, this research does not find any keywords that are related to personal information, and hot topics are blocked on these sites. As shown by the result, 44% of political expressions are censored on Imgur. Furthermore, the findings have helped to answer the research questions. Firstly, political expression is frequently censored by five social network sites. Secondly, Imgur has practiced more content filtering than any other pages. Thirdly, South Korea emphasizes

censorship on these social network sites.

5.2 Conclusion

In this study, the censorship data has been collected from five main social network sites (e.g. Facebook, Twitter, Google, Reddit and Imgur). Beyond that, five different countries, including New Zealand, United States, Russia, Japan and South Korea, are chosen as the research target of this study. In this paper, different test data is used for the measurement of censorship on various sites, which includes top 300 porn sites for Facebook, 441 sensitive keywords for Google, and 392 sensitive keywords with various categories for Twitter, Imgur and Reddit.

As shown by the results, these five sites are currently imperfect to implement censorship. There is still some information on the sites that should have been blocked but not. However, these sites block some information that should not be blocked. Firstly, Facebook only blocks the minority of porn sites in its chatting session. Notably, the majority of unblocked pornography is equally harmful.

Secondly, it can be found that there is just one keyword being blocked by Twitter, while any other keywords associated with damaging information have not been blocked by Twitter. Thirdly, Reddit fails to implement censorship on sensitive keywords that people can easily find out sensitive information by searching sensitive keywords on Reddit. Fourthly, Imgur has the most rigid censorship on blocking keywords. However, some of the blocked keywords are sensitive, but they may not be associated with too much bad information. Finally, Google successfully implements its censorship demands on "country-specific" versions of Google. The test results of Google show that users can still search the results of sensitive informing via keywords searching on Google Korea, yet they cannot access to these search results.

During the data collection process, it can be found that Facebook and Google would inform users the reasons for blocking certain information. Indeed, this research has uncovered notification from Twitter and Imgur for censoring information when searching keywords on these two sites. Through this study, the researchers can gain a better understanding of how censorship is implemented on social network sites. Censorship has become quite common on social network sites, and it will help to explore and obtain a better understanding of censorship.

5.3 Future enhancement

In the future, the censorship from different social network sites may be improved. Additionally, more rigid censorship will be applied by the main social network sites to censor more sensitive information. Operators will be more cautious to implement censorship demands. For instance, they may censor information that promotes suicide

attacks, child pornography and political protest. However, they will not censor the sensitive information by setting relevant keywords into the blacklist.

In consequence, users can view more online information they want. This is because operators will not censor the online information which contains sensitive keywords but has no harm. On the other hand, users do not need to worry about the fault deletion of their posts. This research has several limitations which can be enhanced in the future.

The sample size may not be enough for verifying specific goals of current censorship on SNSs. To explore censorship on social network sites, people can discover a part of blocked keywords on SNSs by searching various keywords. However, the censorship of SNSs usually involves censoring activities on particular sentences and articles, and this information may not contain sensitive keywords. In the future, more test data will be implemented in censorship measurement and it will not be simply limited to a series of keywords. In the further research, the censorship data of censoring activities on sensitive sentences and articles will probably be collected.

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