

A Study on the Recognition for Food Caused by Broadcasting, through Big Data Analysis - Based on the incident of Giant Castella

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Abstract The incidents of garbage dumplings in 2004 and the report on giant castella are the examples that shows how big the influence of broadcasting on the industry is. There were discussions on the importance of securing the objectivity of broadcasting, however, the existing related researches have lacked the analysis of actual proof for the influence of broadcasting contents, and as that of the law and system was confined to theoretical arguments, there were not enough suggestions for realistic alternatives. In this paper, we will examine the influence of broadcasting contents on the food industry through an analysis of actual proof, and propose alternatives in terms of the law and policy for securing the objectivity and fairness of broadcasting, to solve this problem.

Keywords Giant Castella, Food, Broadcast, Objectivity, Big Data Analysis

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1 Introduction

The golden age of cooking show, which began in 2015, has instilled the right and healthy food into the people, and contributed to the formation of a culture of drinking

and eating alone, beyond a simple interest. Culture and interest in the right and healthy food are combined with the situation where startups are getting popular due to business depression, youth unemployment and unstable status at work, thus the number of startups for food business has been steadily increasing. According to the annual statistical report on the national tax, the ratio of restaurant businesses is approximately 25.1%, the highest among the startups in 2014. However, according to the National Statistical Office's research in 2015, approximately 68% of the newly opened restaurant businesses were closed within 3 years, thus it is the area where businesses are frequently opened and closed.

There are many causes which lead to the failure of restaurant business, including the internal factors such as lack of business preparation, failure of resource acquisition, no strategies, and marketing failure, however, the external factors such as the government's regulations and influence of broadcasting are playing a bigger role for it. The incident of giant castella, which became a social issue recently, or that of garbage dumplings in 2004 alerted the people to the danger of broadcasting which buried the related industry and further lead to the innocent victims' death. However, the present researches on broadcasting are not concentrated on the integrated discussion such as the influence or role of broadcasting contents for startup ecosystem, and they lack the actual proof for the influence of it. In addition, the researches on the related legal system are confined to that of the fairness of broadcasting, not a balanced alternative.

Therefore, in this paper, we will perform a study from an integral point of view about the solution for securing the role and fairness of broadcasting media.

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2 Broadcasting and Food

2.1 Current victims of broadcasting

In the section 1 of the article 2 of the Broadcast Act, broadcasting is prescribed as “Planning, organizing or producing broadcast programs, and transmit them to the public (Including the receivers contracted individually, and they are called ‘the viewers’ hereafter) through telecommunications facilities. According to the section 1 of the article 4 of the same act, freedom and independence of broadcasting organization is guaranteed, and the section 3 of the article 5 of the same act prescribes that it should not damage the others’ reputation or infringe their rights. In addition, the section 1 of the article 6 of the same act affirmed the principle that the report through broadcasting system should be fair and objective, and the section 5 prescribes the fairness and public interest of broadcasting by imposing a duty that it should endeavor to reflect the benefits of the disadvantageous group for realizing benefits.

In other words, the freedom and independence of broadcasting are guaranteed, however, it should have fairness and public interest so that it should not damage the reputation of others, or infringe the rights of them. However, as broadcasting has a commercial property which is ruled by the viewer ratings, it sometimes delivers stimulus, unverified and risky contents, which are suggestive, center-biased or exaggerated, to attract the consumers’ interest.

Table 1 Examples of damage by broadcasting (Reconstituted based on O, Se-ra et al., 2012)

Occurrence year	Name of incident	Contents
1989	Beef tallow ramen	5 food companies including Samyang Foods used industrial beef tallow which was classified as inedible in USA, and 10 people including the CEOs and responsible staffs were brought into custody. The ramen market froze because of the announcement of the prosecutors who did not have a professional knowledge
2004	Garbage dumplings	Prosecutors put the producers and distributors of dumplings made of wasted dried radish under custody, and the Ministry of Food and Drug Safety announced the list of 25 bad dumpling manufacturers
2005	Lead kimchi	Go, Gyeong-hwa of the Grand National Party, a member of the National Assembly, disclosed that 0.12~0.57 ppm of lead (5

Occurrence year	Name of incident	Contents
		times more than that of the Korean products) is found in Chinese kimchi, in the material for the parliamentary inspection, and the Ministry of Food and Drug Safety announced that it is safe to eat as just 0~0.05 ppm of lead was found.
2005	Kimch with parasitic eggs	Incident that parasitic eggs are found in Chinese and Korean kimchi. It is not easy to be infected by parasites even if eating the food with parasitic eggs, however, it developed the consumers’ anxiety as the government announced hastily without sufficient reviews
2006	Atopy cookies	One domestic media reported that if eating the cookies with food additives, it worsens the atopic skin diseases, and made the consumers worried, however, the Ministry of Food and Drug Safety announced that there are no relevance between them
2007	Heavy metal red clay pack	In the consumer ombudsman program hosted by the producer Lee, Yeong-don in 2007, it was reported that red clay pack contains a lot of iron powder and heavy metal, however, it was revealed by the Ministry of Food and Drug Safety that the magnetite contained in the pack is not something came from outside, but one of the original ingredients which is not harmful to health
2008	Bovine spongiform encephalopathy	Dispute on the mad cow disease had begun after MBC PD Notebook’s episode “Urgent report! American beef, it is safe from mad cow disease?” was released on April 29, 2008, as the agreement on importing American beef was concluded. It was a big case as a total of 161 reports were released from April, 2008 to the beginning of November in 2010
2010	Cadmium octopus head	Seoul city office recommended to remove the octopus head, which were sold in major distribution businesses, as it contains cadmium that was exceeding the limit prescribed in the standard, and the Ministry of Food and Drug Safety announced that the level of cadmium content of the octopuses, that were inspected by the city office, was below the standard for safety, except for 1 product imported from China
2017	Giant Castella	In the Food X-file program of Channel A, it was reported provocatively that cooking oil is contained in giant castellas as if it is not an edible food, and a lot of giant castella businesses were closed

<Table 1> shows the representative examples of the exaggerated reports on the incidents related to food safety, and announcement of the prosecutors and media who did not have a professional knowledge. We can easily find the social problems caused by provocative media reports without objectivity in the incidents which intensified the confusion of consumers, and caused industrial and economic losses of the country, and the big castella in 2017, garbage dumplings in 2004, and heavy metal red clay pack in 2007 were the representative examples of them.

On June 7, 2005, all of the morning papers provocatively reported in the general news section that wasted materials are contained in dumpling fillings. The sales of dumpling industry were decreased by a maximum of 90%, and more than 130 dumpling businesses fell into a bankruptcy crisis. In addition, the sales of pickled radish producers were decreased by up to 70%, and Japan banned the import of all the Korea-made dumplings.

However, the problem was just the sanitary condition of “radish edge” contained in dumpling fillings, not a garbage or inedible food. The sanitary condition as well was caused by the turbidity of washing water. In addition, the amount of dumplings containing the problematic “radish edge” was taking up to 10% of the total production, and it was used just for the materials of fried dumplings, however, even the irrelevant boiled dumpling manufacturers had to close their businesses. As the anxiety of the people went to extremes, the Ministry of Food and Drug Safety announced the list of 25 faulty dumpling manufacturers which once used the poor quality radish edges for dumpling fillings from 2002 to March, 2004, however, even the contents of the list were incorrect. As a result, Mr. Shin, the CEO of Vision Food, threw himself into the Hangang River while complaining of an injustice, people denounced the over investigation of the police, and the exaggerated and provocative reports of the media. Eventually, the Minister of Food and Drug Safety admitted their poor investigation on June 15 of the same year (Kim, Seok-sin, 2011).

The incident of heavy metal red clay pack is also known as that of Kim, Yeong-ae. In the consumer report program hosted by the producer Lee, Yeong-don, it was reported that lots of heavy metal such as iron powder were detected in red clay packs. In the program, he insisted that the iron powder was produced as the iron ball of grinder is abraded, and it was not the specific ingredient of red clay. Later, the Ministry of Food and Drug Safety announced the investigation result saying that the included magnetite is not harmful for health as it is a specific ingredient of red clay pack, not the one came from outside, however, the sales of red clay pack already went down drastically,

and the industry had a rush of refunds.

All the companies including that of Kim, Yeong-ae went bankrupt, and she sued KBS and its production staffs. At the first damage claim suit, it was sentenced that 2 producers including Lee, Yeong-don and KBS should pay 100 million won, however, at the trial on appeal, they were found to be not guilty as it was not intentional. While the lawsuit was going on, Kim, Yeong-ae was divorced her spouse, who was also her business partner, and confessed that she was having depression and stresses in the TV broadcast. She died of a complication from pancreatic cancer in 2017.

2.2 The incident of giant castella

In the Food X-file program of Channel A aired on March 12, 2017, an atmosphere of terror was created by reporting that giant castella is harmful for body by highlighting the fact that cooking oil is contained in its recipe. In the aftermath of the program, the daily sales of giant castellas went down from 1.8 million won to approximately 100 thousand won, and a lot of small-scale businesses were becoming bankrupt. As the miserable conditions of small-scale businesses were posted on SNS, netizens were annoyed by the unfair reports just for viewer ratings, and even the food specialists expressed their opinion through SNS that the cooking oil in giant castella is not harmful.

The problems of giant castella presented by Food X-file were as follows. First, cooking oil is used instead of butter. Food X-file disclosed the fact that butter is used for making the original Taiwanese castella, however, cooking oil is included in the recipe of giant castella, in Korea. Second, too much cooking oil is used. They claimed that 700ml of cooking oil is used for one castella in the process of production, and it was an excessive amount. Third, harmful emulsifier is used. Emulsifier is used in the process of production, and they reported that it is harmful for human body by generalizing a few companies. Fourth, harmful liquid egg is used. They reported by generalizing a few companies that used liquid egg yolk which is made in the factory in the process of production.

The specialists of the related area commented negatively on four problems, that Food X-file pointed out, as follows. First, using cooking oil has no problem. Butter is animal saturated fats which contain a lot of cholesterol, and cooking oil is vegetable unsaturated fats without cholesterol. These two are just different, but it is not a matter of good or bad. Second, it is not a problem if using that much amount of cooking oil. In the broadcast, it was described that 700ml of cooking oil was used per one castella, however, it was not for one castella but one plate of it, and it is almost

the same amount comparing to that of most of the other recipes. In addition, most of the manufacturers used approximately 500ml, and they generalized a few ones using 700ml of it.

In addition, as the company, which was introduced in the program, was using 700ml of canola oil which is more expensive than normal cooking oils, it was something to be praised. Third, using emulsifier is not a problem at all. Fat is composed of 3 glycerines, and emulsifier is composed of 1 fatty acid. When fat goes into the body, it will be absorbed after being resolved into monoglyceride. This does not cause any problem, and the use of emulsifier is limitless as it is not toxic. Fourth, using liquid egg is not a problem. Liquid egg is supplied in the most hygienic method after separating the egg white and yolk, and most of the bakeries are using it for the uniformity and safety of material quality, and the efficiency of production. According to the specialists' comments, Food X-file aired a follow-up episode, however, they did not apologize about their unobjective report, and just expressed their justification and injustice.

2.3 Current regulations on the domestic and overseas broadcasting

In case of Korea, the government regulates the broadcasting companies for the publicness and fairness of the reports, while guaranteeing a freedom of expression based on the 'Constitutional Law,' 'Broadcast Act', 'Act on Press Arbitration and Damage Relief,' 'Basic Act for the Development of Broadcasting and Communications' and 'Act on the Establishment and Operation of the Broadcasting and Communications Commission.' According to the 'Broadcast Act', broadcasters have to self-screen their programs considering its social influence and contribution. If broadcast programs (except for news reports) are inappropriate, the authority prevents the possible damage by banning them after a screening, before they go on the air.

According to the 'Act on Press Arbitration and Damage Relief,' the rights of claiming for corrected news are given to the victims who are damaged as the media report about the fact is incorrect after the broadcast. The victims, who are damaged by the media report based on fact, have the right of reply. In addition, if someone is reportedly committed a crime or received a criminal penalty, and proved not guilty afterwards, he/she will have a right to claim for ex post facto report. Besides, if mental or physical damage is created by an unlawful act which was committed on purpose or by accident, the victims can claim for compensation against the press. If people's reputation is

defamed by broadcast media, they can demand the rightful disposition to recover their reputation by claiming for an order of compensation and correction report.

Table 2 Current regulations of domestic and foreign broadcasting systems

Classification		Contents
Domestic	Before	<p>Article 86 of the Broadcast Act (Self-screening) ① Broadcasting business operators have to establish an organization, which can self-screen the broadcast programs (except for the ones for news report), and the programs should be screened before they are broadcasted. However, the community radio broadcasting business operators should hold the assesment of broadcasting services, where the listeners of broadcast zone participate in, more than once a year.</p>
	After	<p>Act on Press Arbitration and Damage Relief,</p> <p>Article 14 (Conditions of claiming for a correction report) ① The people, who are damaged ('Victim' hereafter) by the media report which was released based on a factual opinion, may claim for a correction report on the contents of already released one, against the press, internet news service provider or internet multimedia business operator ('Press, etc.' hereafter) within 3 months from the day they realized it, if the contents of the report is proven to be incorrect. However, it does not apply when it is later than 6 months from the media report.</p> <p>Article 16 (Rights of claiming for an objection report) ① The people who are damaged by the media report, which is released based on a factual opinion, may claim for an objection report on the related news contents, against the press, etc.</p> <p>Article 17 (Rights of claiming for an ex post facto report) The people, who are reported or announced to have criminal charges or activities by a press, etc., may claim for an ex post facto report against the press within 3 months from the day they realized it, if the criminal lawsuit ends up with a judgment of acquittal or equivalent to it.</p> <p>Article 30 (Compensation for damage) ① The people who have a financial damage, personal rights violations or other mental anguish, because of an illegal act that was committed by the press, etc. on purpose or by accident, may claim a compensation for damage against the press, etc.</p> <p>Article 31 (Special provisions in case of defamation) For the people who damage someone else's reputation, the court may order them to pay for the damage according to the victim's claim, or to do something for recovering reputation by announcing a correction report, together with a compensation for damage.</p>
Overseas	USA	<ul style="list-style-type: none"> - Full guarantee of the freedom of expression, minimum regulations - Regulatory philosophy comes before regulatory system - Endeavor of the social constituents for securing publicness and fairness
	England	<ul style="list-style-type: none"> - BBC: Political and economic independence of broadcasting is guaranteed through Royal Charter and agreements, and made a system and framework for self-regulation - Used as a guideline for other broadcasting companies - ofcom - Single regulatory organization for broadcasting and communications (A guideline for respecting publicness and privacy)

Classification		Contents
	Japan	Under the legal regulation which fully rules out the intervention or interference by civil authorities, the private sector supports for self-regulation - Recognizing the social influence of broadcast and scarcity of radio frequency resources - Suggesting a basis for partially regulating the broadcast contents - Overcoming the limit of self-regulation of broadcasting companies through BPO (Business process outsourcing)

In case of the US, the freedom of expression is emphasized in the article 1 of the Bill of Rights. Screening the broadcast contents itself is regarded as an infringement of the freedom of expression. Therefore, any pre-censorship for broadcast contents is not allowed, and they do not do any legislative activities which would disturb the freedom of express. However, they have a limited number of regulations on pornography to protect children and teenagers. To protect the freedom of expression guaranteed by the Bill of Rights, it seems that they tend to agonize about the regulation philosophy and think that it will be more effective to discuss about this with the constituents of the society in the new media environment, rather than agonizing about the regulation system (Korea Communications Commission, 2012).

In case of England, BBC, which can be regarded as the beginning of British broadcasting history, made a system and legal framework for political and economic independence with which they can regulate by themselves through the independent systems called Royal Charter and agreements, and these frameworks provided other broadcasting companies with a standard for regulating contents¹⁾. ofcom is in charge of policy making and content regulation for broadcasting. As one organization takes both policy and regulation, it increases the efficiency of policy and content regulation for broadcasting.

In case of Japan, they rely on the self-screening by private organizations for broadcast contents while minimizing the number of interruptions and interferences by the administrative authority. In addition, they have overcome the limit of self-screening by handling the pre-censorship of broadcasting companies through BPO (Business process outsourcing). However, by adopting the concept of the influence of broadcasters to the society or the scarcity of radio frequency resources, they proposed a basis for regulating broadcast contents.

With regard to the regulation on broadcast contents, there are a lot of controversies domestically and internationally. To commonly guarantee the freedom of expression, pre-censorship is prohibited. In case of the USA, they have a limited number of regulations on pornography to protect

children and teenagers. In case of England, broadcasting companies raise the publicness of broadcasting through political and economic independence. In case of Japan, they proposed a basis for regulating broadcast contents with the concept of social influence and the scarcity of radio frequency resources. In case of Korea, we regulate through self-screening before the programs are broadcasted, and invest the victims with rights of claiming for a correction report, if damages are created. However, self-preliminary review cannot be effective unless the broadcasting business operator is not economically and politically independent, and various claiming rights have a limit for compensating the damage which is created after the broadcast.

3 Related Researches

3.1 Broadcasting and risk communication

Risk communication is defined as ‘a communication process through exchanging the information related to risk information and threat factors’ (U, Jong-min, et al., 200747), “all the efforts for eliminating psychological anxiety or fear by making the interest group, including the risk evaluators, risk managers, consumers and business providers, understand the information in a right way, and by making them in the state of peace of mind, in the process of risk evaluation and management (Lee, Gi-heon, 2008),” and “a communication process where the damage, which is predicted in the relationship between individuals and society, is thematized (Song, Hae-ryong et al., 2012)

Broadcasting system functions as a risk communicator, and a medium of connecting other risk communicators. It prevents the damages from risks and deriving the government policies or regulations by eliminating or reducing the risk factors through letting people know about it (Lee, Gui-ok, Park, Jo-won, 2006). The function of broadcasting like this can be realized as broadcasting has a huge influence. Especially, the influence of the programs about food safety is bigger. According to a survey, approximately 60% of the consumers are getting information on food from mass media such as broadcasting and newspapers (Lee, Gi-heon, 2008). Recently, the influence of tv programs about food safety is getting greater as it spreads online after the program is released. Therefore, as the related businesses are closed after the programs about food safety are broadcasted, the related industry as well could be in danger of going bankrupt, or it may cause even a trade conflict.

The reason why the influence of the programs about

1) Korea Communication Standards Commission, 2012

food safety is huge is because food safety has characteristics which is different from that of other areas. Choosing food and taking a risk are personal matters, and it is hard for consumers to recognize the harmfulness of food until it is revealed. Due to the characteristics of this issue, consumers feel uncomfortable if food safety is not verified (Lee, Gi-heon, 2008). In addition, as the issue of food safety is closely related to the national safety and health, if consumers sense a risk from a specific food, consumption of the related food is stopped or reduced, and they tend to stigmatize other foods through group categorization (Yang, Jeong-eun, 2015)

Therefore, if a report on food safety is broadcasted without a proper risk communication, it may create a considerable side effect. As the unidentified risk is reported in advance, social fear and the anger of consumers may be created, and due to the exaggerated and biased report on the risk, the related industry may be in danger of going bankrupt as the consumption is rapidly decreased (Lee, Gui-ok, Park, Jo-won, 2006). Delivering a wrong or inconsistent information on food safety causes distrust of the consumers. And this may lead to an actual damage as it brings about the anxiety of consumers and social chaos (Yu, Hyeon-jeong, 2013). In severe cases, stimulus reports sometimes damage the public image, and may lead to a trade conflict by stimulating the government of other countries as shown in the incident of kimchi problem. To reduce this kind of damages, risk communication should be done properly, however, it is difficult because of the characteristics and limit of broadcasting.

Broadcasting has publicness as well as commercial characteristics. Therefore, although the program on food safety have a huge influence like this, the media often releases simplified, biased and exaggerated reports to draw an attention from consumers, while considering economic and social interests (Lee, Gui-ok, 2007; Lee, Gi-heon, 2008). Due to the characteristics of broadcasting where reports should be released within a limited time, they tend to rely on a source from the government, or neglect to check the facts. As the reporters have not much professional knowledge, they tend to report based on a cursory fact, rather than having an in-depth information (Lee, Gui-ok, 2007). On the other hand, broadcasters have a freedom of speech, however, they also have a social responsibility based on their influence. Therefore, they should have a fairness, however, as fairness is realized politically and socially, being objective does not necessarily mean being fair (Choi, Yeong-jae, Hong, Seong-gu, 2004). Therefore, it is not easy to find

out if it is fair in advance, and if it is recognized beforehand, the freedom of speech may be infringed. Risk communication should be executed considering the characteristics and limit of broadcasting, and freedom and social responsibility given to it.

The possibility of reducing the risk through effective risk communication was also introduced in the communication theory. The theory of discourse is the one insisting that people need to have a procedure of conversation, and participated in that while having a consensus that humans' recognition is incomplete and relative. At this time, all the participants should mutually respect one another as an equal and free human being (Lee, Jun-il, 2000). It can be applied to broadcasting. The participants of the broadcast programs may be influenced by their personal interests, or there may be errors or problems which are caused by their limitation of recognition ability. To overcome this kind of problems, a lot of people as possible including broadcasters, producers, specialists and the people of the industry related to the subject of broadcasting should have a conversation based on 'mutual respect as a human being.' By doing so, we can prevent the biased and exaggerated broadcasting, and secure the fairness, publicness, professionalism and objectivity of it. And the conversation between those interest groups can also minimize the damage from broadcasting, including the innocent victims, by reducing the risk of broadcasting about the food safety. In addition, it will prevent the negative influences such as anger of the consumers, distrust, anxiety and social fear caused by the uncertain, wrong or inconsistent risky reports, and the stigmatization through group categorization.

The characteristics of giant castella case is that there was a group of specialists, which was different from the existing broadcast programs about food safety. In the program, it was reported that the recipe of giant castella has a problem based on the fact that cooking oil was used instead of butter in the process of making the product, and its amount was excessive. Then, the specialists commented negatively on the issues raised by the program, through SNS. Therefore, we can find out that the broadcasters lost the professionalism of broadcasting as they neglected to collect the opinions from the specialists in the process of reporting, despite the fact that it could create a social problem.

In addition, the problem was raised when the giant castella was getting greatly popular, and it gave a huge damage to the giant castella industry by raising a problem of its recipe. In other words, as it raised a dispute with

no professionalism and objectivity when people are greatly interested in the giant castella, the public opinion against the whole industry became negative, and most of the manufactures had to close their businesses. Furthermore, although the raised problem was confined to some of the franchise stores or businesses, people thought that it was the problem spreaded over the whole industry. As the whole giant castella industry was stigmatized, the fairness of broadcasting was also lost. However, if there was a conversation among the interest groups including the specialist, people from the giant castella industry and bakery businesses by applying the communication theory in the process of screening the program, the risk communication could be effective to solve the problem. Therefore, more professional and objective broadcasting can be realized as it is possible to find the errors or problems, that the production staffs could not find, from the diverse viewpoints of the participants in the screening process, while preventing the loss of fairness of broadcasting. It will prevent the collapse of the whole related industry, not just a few problematic ones, as shown in that incident, by decreasing the number of innocent victims through reducing the risk caused by the broadcasting system.

In addition, it can also minimize the anger of consumers and social chaos caused by the reports released based on uncertain and wrong information, through providing correct information. And if the productions and broadcasting companies offer an education program, where the innocent victims of broadcast reports and specialists are participating in, to strengthen the sense of ethics, it will reduce the number of problems created by the broadcasters, through releasing responsible broadcast programs.

3.2 Fairness and accountability of broadcasting

The necessity of regulation on the unfair broadcasting system, which releases stimulus and unverified risks with suggestive, biased and exaggerated contents, has been raised consistently from the past. The related studies to this problem includes ‘A Study on Fairness Standard of Broadcasting (Go, Min-su, 2009; Gwon, Hyeong-dun, 2014),’ ‘A Study on the Responsibility of Public Broadcasting (Park, Hong-won, 2004, Jeong, Su-yeong, 2009; Bae, Jin-a, 2007; Gang, Hyeong-cheol, 2007),’ ‘A study on the Direction of Improving Legal System for Securing Fairness and Responsibility of Broadcasting (Gang, Hyeong-cheol, 2007; Go, Min-su, 2009; Gwon, Hyeong-dun, 2014).’

First, speaking of the studies on fairness standard, Go, Min-su (2009) insisted that providing the listeners or viewers with security means, so that they can get the information needed for acting as a wise voter and citizen, is the country’s constitutional challenge derived by the freedom of broadcasting, while urging a positive legislative improvement so that the fairness system can conform with the Constitution, and Gwon, Hyeong-dun (2014) insisted that the legal scope, where the government can interfere to secure the fairness of broadcasting, should be defined first while clarifying the conceptual nature of fairness, as it is not specified but a concept of value-oriented nature which can be interpreted differently depending on diverse viewpoints.

Second, speaking of the studies on the responsibility of broadcasting, Park, Hong-won (2004) studied about the accountability concept as a measure for harmonizing the freedom and responsibility of press, Jeong, Su-yeong (2009) explained the transition process and relationship between social responsibility theory and the concept of countability by re-examining the Hutchins Report, Bae, Jin-a (2007) proposed the responsibilities of public broadcasting by classifying them into 4 types such as legal responsibility, hierarchical responsibility, professional responsibility and political responsibility depending on the subject to inquiry (inside and outside of a broadcasting company) and the level of autonomy, and Gang, Hyeong-cheol (2007) introduced an imputation model and answer-adoption model to adopt a responsibility improvement device, as a process of forcing the result of performances, and evaluating it privately, based on the standard connoted in specified criteria or its requirements.

According to the report (Commission on Freedom of the Press, 1947) of Hutchins Commission which became the core value of social responsibility theory, broadcasters have a freedom of speech, however, social responsibility is imposed to them, as well. It suggested that the broadcasters should fulfill the moral duty called accountability (responsibility) to have a freedom of speech consistently. It is because we have to guarantee the freedom of speech of the people who cannot have one as the media monopolizes it, although it has to be shared by everyone. (Park, Hong-won, 2004, Jeong, Su-yeong, 2009). Until now, the victims of food safety broadcast could not have a freedom of expression as they have less influence and power comparing to the broadcasters, even though they provided an explanation. As a result, the damage from food safety broadcast seemed to be getting larger.

The incident of giant castella was exceptional in terms of the fact that there were influential specialists, being different from other cases, however, as their influence was a lot smaller than that of the broadcasters, broadcasters have to find a way to fulfill the demand for social responsibility and accountability.

Lastly, speaking of the studies about the direction of legal system improvement to secure the broadcasting's fairness and accountability, Gang, Hyeong-cheol (2007) insisted that it will be the most effective if making an autonomous accountability system under the minimum external regulations based on the answer-adoption model which was introduced by McQuail (2003) to secure the public broadcasting's fairness and accountability, Go, Min-su (2009) urged a positive improvement of legislation, from the constitutional point of view, so that the existing fairness system can conform with the Constitution, to find a measure with which we can eliminate the logical fallacy in the process of forming opinion in relation to the broadcasting business operator's biased opinion or personal demonstration, and Gwon, Hyeong-dun (2014) stated his view by saying that as the fairness is not specified and it is a value-oriented concept which can be interpreted differently depending on diverse viewpoints, broadcast programs should be self-regulated, and the objective legal system should be composed of the right combination of regulations on program organization and ownership, together with the amendment of abstract and comprehensive review regulations and the law related to broadcasting.

The existing researches lack the theoretical discussion from an integrated viewpoint including the role and influence of broadcast contents on the startup ecosystem, and there also are not enough analysis of actual proof about the influence of broadcast contents. In addition, the researches on the existing related legal system are about the fairness of broadcasting, and lack the discussions about the balanced alternatives. There are a few researches which were performed based on the cases of foreign countries including USA, and from the constitutional viewpoint, however most of them are not relevant to the Korean situation, and their discussion are very limited.

4 Method of Study

We have collected and analyzed the data, based on the incident of giant castella occurred recently, to find out the influence of broadcast programs. By using TEXTOM which is a program for collecting and processing big data, we have collected data from the web pages, personal blogs and news of each portal that provides relevant information. TEXTOM is a big data analysis tool that collects, purifies, analyzes and visualizes it.

It is a big data analyzing solution which collects diverse web data of each channel, and executes text mining and analysis of social network based on the connection-orientation level by using the crawling method. The representative researches used the same methodology are 'An Exploratory Research on Contents Production Method Utilizing Big Data: Based on TV home shopping' (Kim, Hae-won, Jeon, Chae-nam, 2014), 'Analysis of Attitudes against Using the Five-star Hotel's Package Service by Applying Network Text Analysis Method_Using portal sites' (An, Myeong-suk, O, Ik-geun, 2015), 'A Study on the Recognition of Korean Tourism through Big Data Analysis' (O, Ik-geun, Lee, Tae-suk, Jeon, Chae-nam, 2015), 'Analysis of Key Word Network against the Issue Related to Cruise Tourism' (Kim, Bo-gyeong, Kim, Mi-gyeong, 2015), and 'A Study on the the Government Policy and Recognition Change of the People against Camping through Analyzing the Big Data of Social Media' (Jang, Mi-hwa, Yun, Yeong-il, 2016).

In this study, we have focused on the recognition change of the people before and after the release of Food X-file program, based on the incident of giant castella, and collected the data including the key word 'giant castella' from the portals including Naver, Daum and Google during each 50-day term, after setting up the analyzing period of 50 days before (January 21, 2017 to March 11, 2017) and after (March 13, 2017 to May 1, 2017) the broadcast. As a result, we have collected 2,715 postings from Naver, 1,913 from Daum, and 315 from Google before the broadcast, and 3,322 postings from Naver, 2,297 from Daum, and 646 from Google, after the broadcast. Based on the data composed of a total of 11,208 postings, we have analyzed the key words, and performed text mining and social network analysis after correcting and converting the related major key word data.

Table 3 Amount of collected data

Channel for collection		Before the broadcast	After the broadcast
Naver	Web	632	1000
	Blog	1000	1000
	News	50	322
	Cafe	1000	1000
	Jisikin	33	183
Daum	Web	676	676
	Blog	916	895
	News	65	370
	Cafe	225	306
	Jisikin	31	50
Google	Web	180	478
	News	116	134
	Facebook	19	34

5 Results of the analysis

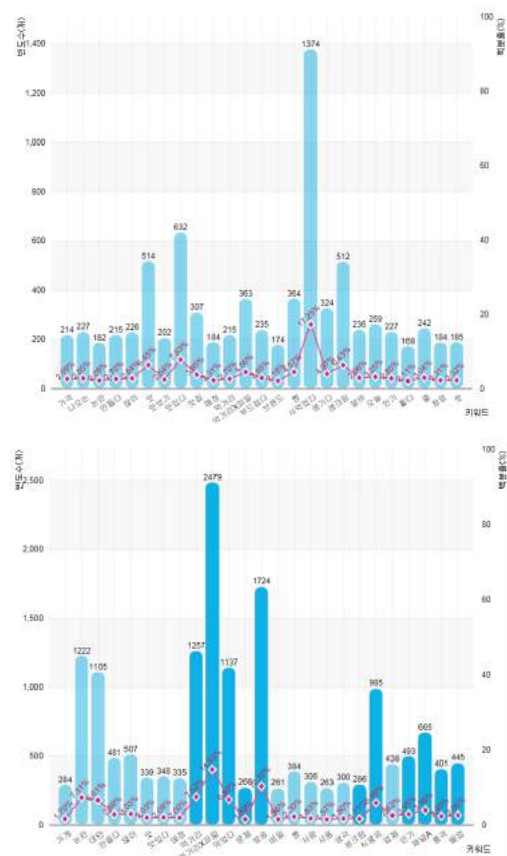
5.1 Results of the frequently used word analysis

Based on a total of 11,208 collected data, we have extracted top 50 major key words during the periods before and after the broadcast, and analyzed the recognition change against giant castella. Generally, we secure the objectivity and credibility of positive and negative evaluations on the extracted words, based on the emotion analysis dictionary. However, in case of Korean language, there is no standard emotional word dictionary, and some of the emotion analysis dictionaries or services were terminated after a short-term service. It is because establishing Korean emotional word dictionary is not easy due to the characteristics of Korean language (Kim, Myeong-guy et al., 2009; An, Jeong-guk, Kim, Hui-ung, 2015; Yun, Yu-dong et al., 2016). Therefore, we used the computerized English emotional word dictionary (Hu and Liu, 2004) of the University of Illinois after translating it, and in case of the words which is not contained in the dictionary, researchers judged by considering the relationship with the related incident. As there are many of ambiguous words due to the characteristics of Korean language, and the connoted emotions can be different depending on the context, the subjective judgment of researchers may have contributed to the classification.

According to the results of analysis, the highlighted key words related to giant castella for 50 days before the broadcast were evenly distributed with positive ones such as ‘bought and ate’, the 4th place, ‘delicious’ the 7th, ‘have’ the 13th, ‘good restaurant’ the 14th, ‘line’ the 16th, ‘soft’ the 18th, ‘popular’ the 20th, ‘hot’ the 28th, ‘startup’ the 29th, ‘good’ the 34th, ‘in line’ the 37th,

‘trend’ the 40th, and ‘open’ the 42nd, as shown in <Table 3>. Through this, we could find out that the recognition against the product before the broadcast was very positive. However, we have extracted some of negative key words such as ‘Food X-file’ the 12th and ‘dispute’ the 31st, and we think that it was because of the stimulus trailer of Food X-file, before the broadcast.

On the other hand, the highlighted key words related to giant castella for 50 days after the broadcast were evenly distributed with negative ones such as ‘Food X-file’ the 4th place, ‘dispute’ the 7th, ‘cooking oil’ the 10th, ‘shut down’ the 15th, ‘shock’ the 18th, ‘problem’ the 30th, ‘use’ the 31st, ‘secret’ the 32nd, ‘truth’ the 38th, ‘recipe’ the 39th, ‘put in’ the 43rd, ‘accusation’ the 46th, and ‘damage’ the 47th, as shown in <Table 5>. There were a few positive extracted key words such as ‘popular’ the 13th, ‘delicious’ the 22nd and ‘good’ the 33rd, as well. In other words, we could digitize the influence of broadcasting on the people’s recognition through the analysis result which shows that the people who was positive for giant castella were turned into negative after the broadcast. The result that is expressed by a graph using the frequency of above key words is shown in <Picture 1>.



Picture 1 Graph of the frequency of major key words before and after the broadcast

Table 4 Result of analyzing the frequency of major words before broadcast

Ran king	Word	Ratio	Ran king	Word	Ratio
1	Giant castella	6.29%	26	House	0.25%
2	Castella	4.39%	27	Tasting	0.24%
3	Giant	2.67%	28	Hot	0.22%
4	Bought and ate	1.65%	29	Startup	0.22%
5	Taiwan	1.56%	30	Shop	0.22%
6	Tamsui	1.04%	31	Dispute	0.22%
7	Delicious	0.76%	32	Brand	0.21%
8	Taste	0.62%	33	Society	0.20%
9	Fresh cream	0.62%	34	Good	0.20%
10	Taiwanese sister	0.48%	35	Postscript	0.20%
11	Bread	0.44%	36	Person	0.20%
12	Food X-file	0.44%	37	In line	0.19%
13	Have	0.39%	38	Place	0.19%
14	Good restaurant	0.37%	39	Broadcast	0.18%
15	Today	0.31%	40	Trend	0.18%
16	Line	0.29%	41	Sell	0.18%
17	Part-time job	0.28%	42	Open	0.17%
18	Soft	0.28%	43	Taiwanese bakery	0.17%
19	Served	0.27%	44	Thought	0.17%
20	Popularity	0.27%	45	Taiwanese giant castella	0.17%
21	Many	0.27%	46	Time	0.17%
22	Food	0.26%	47	Original	0.15%
23	Make	0.26%	48	Language	0.15%
24	Price	0.26%	49	Store	0.15%
25	Taiwanese castella	0.25%	50	Hello	0.15%

Table 5 Result of analyzing the frequency of major words after broadcast

Ran king	Word	Ratio	Ran king	Word	Ratio
1	Giant castella	5.14%	26	Person	0.27%
2	Castella	4.39%	27	Thought	0.27%
3	Giant	3.05%	28	Fresh cream	0.26%
4	Food X-file	2.21%	29	Store	0.25%
5	Broadcast	1.54%	30	Problem	0.24%
6	Food	1.12%	31	Use	0.23%
7	Dispute	1.09%	32	Secret	0.23%
8	Ate	1.01%	33	Good	0.22%
9	Taiwan	0.99%	34	Go in	0.22%
10	Cooking oil	0.88%	35	Today	0.22%
11	Channel A	0.59%	36	Open	0.22%
12	Many	0.45%	37	After	0.21%
13	Popularity	0.44%	38	Truth	0.21%
14	Make	0.43%	39	Recipe	0.20%
15	Shut down	0.40%	40	Program	0.20%
16	Business	0.39%	41	Have	0.19%
17	Recent	0.39%	42	Reporter	0.19%
18	Shock	0.36%	43	Put in	0.19%

Ran king	Word	Ratio	Ran king	Word	Ratio
19	Tamsui	0.35%	44	Sell	0.19%
20	Bread	0.34%	45	Taiwanese castella	0.18%
21	Pass	0.33%	46	Accusation	0.18%
22	Delicious	0.31%	47	Damage	0.17%
23	Taste	0.30%	48	Owner	0.17%
24	Shop	0.30%	49	Franchise	0.17%
25	Served	0.27%	50	Fact	0.17%

5.2 Result of analyzing the centrality of major words

The result of analyzing the centrality of connection of the major words extracted for 50 days before and after the broadcast is as follows. The centrality of connection is a standard with which we can measure the connectivity of a specific word in the network established for each 50 days before and after the broadcast, and the centrality of connection gets higher when the number of connected words are increased. As a result, it was verified that the positive words such as 'delicious', 'have', 'line,' 'soft', 'good restaurant', 'good', 'hot', 'in line', 'startup', 'popularity', 'trend' and 'like' are evenly distributed as shown in <Table 6>.

On the other hand, the centrality of connection of negative words such as 'Food X-file,' 'dispute', 'cooking oil', 'Channel A', 'problem,' 'shut down' and 'shock' were measured as high, as shown in <Table 7>, and the positive words which were ranked on the top such as 'delicious', 'good', 'popularity', 'trend' and 'startup' had relatively a low centrality of connection. This shows the similar aspect to that of social network analysis result above.

Table 6 Result of analyzing centrality of connection before broadcast

Ran king	Word	Centra lity	Ran king	Word	Centra lity
1	Giant castella	0.172	26	Thought	0.010
2	Castella	0.110	27	Place	0.010
3	Bought and ate	0.065	28	Hot	0.010
4	Giant	0.056	29	Part-time job	0.010
5	Taiwan	0.043	30	Person	0.009
6	Delicious	0.031	31	Postscript	0.009
7	Tamsui	0.030	32	In line	0.009
8	Taste	0.028	33	Taiwanese giant castella	0.009
9	Fresh cream	0.024	34	Shop	0.009
10	Today	0.021	35	Startup	0.009
11	Bread	0.019	36	Tamsui giant castella	0.009
12	Have	0.017	37	Popularity	0.009

Ran king	Word	Centra lity	Ran king	Word	Centra lity
13	Taiwanese sister	0.016	38	Trend	0.008
14	Taiwanese castella	0.014	39	Time	0.008
15	LIne	0.013	40	Like	0.008
16	Many	0.013	41	Store	0.008
17	House	0.012	42	Brand	0.008
18	Soft	0.012	43	Language	0.008
19	Served	0.012	44	Road	0.008
20	Good restaurant	0.012	45	Location	0.007
21	Good	0.012	46	Boy	0.007
22	Make	0.012	47	Snack	0.007
23	Tasting	0.011	48	Korea	0.007
24	Open	0.011	49	Hello	0.007
25	Price	0.011	50	Broadcast	0.007

Table 7 Result of analyzing centrality of connection after broadcast

Ran king	Word	Ratio	Ran king	Word	Ratio
1	Giant castella	0.157	26	Shop	0.012
2	Castella	0.102	27	Channel A	0.012
3	Giant	0.074	28	Problem	0.012
4	Ate	0.048	29	Pass	0.012
5	Broadcast	0.042	30	Shut down	0.012
6	Food X-file	0.040	31	Go in	0.011
7	Taiwan	0.035	32	Taiwanese castella	0.011
8	Food	0.030	33	House	0.011
9	Cooking oil	0.028	34	Store	0.011
10	Dispute	0.027	35	Ate	0.011
11	Many	0.020	36	Schock	0.010
12	Make	0.018	37	Work	0.010
13	Bread	0.018	38	Use	0.010
14	Delicious	0.018	39	Price	0.010
15	Taste	0.018	40	Have	0.010
16	Person	0.016	41	Reporter	0.010
17	Today	0.016	42	Franchise	0.009
18	Good	0.016	43	This time	0.009
19	Fresh cream	0.015	44	Line	0.008
20	Thought	0.014	45	Trend	0.008
21	Served	0.014	46	Put in	0.008
22	Tamsui	0.014	47	Unawarely	0.008
23	Recent	0.014	48	Fact	0.008
24	Popularity	0.013	49	Startup	0.008
25	Business	0.013	50	Sell	0.007

5.3 Analysis of Convergence of iterated correlation

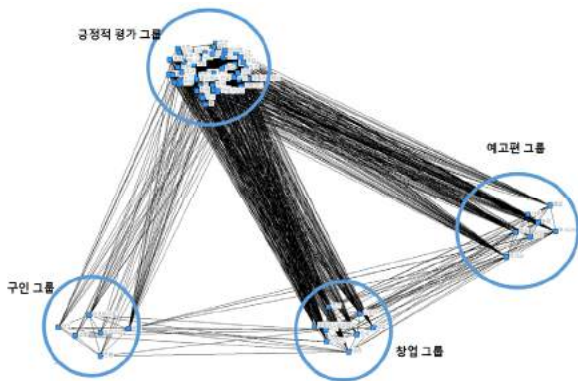
Analysis of convergence of iterated correlation is an analysis method with which we can find out the relationship between the formed groups, after grouping the words which have a certain similarity, by analyzing the relationship between words repeatedly. In this study,

based on the data frequency analysis, degree centrality of major words, and the result of analyzing relationship matrix, we have analyzed the convergence of iterated correlation for 50 days each, before and after the broadcast. As a result, a total of 4 groups were created for 50 days before the broadcast. First, the biggest group was composed of positive key words such as 'giant castella', 'line', 'bought and ate', 'near', 'snack' and 'taste', and we designated it as a 'positive evaluation group.' 2 other groups, which were smaller than the 'positive evaluation group', were similar to each other in terms of size, and we classified it as the 'startup group' which includes the words such as 'recent', 'brand', 'nationwide', 'shop' and 'Daejeon', and the 'trailer group' which includes the key words of 'startup group', 'broadcast', 'society', 'dispute' and 'truth.' Lastly, the smallest group was composed of the key words of 'recruit', 'gender', 'part-time job', 'close of the subscription' and 'age', and we named it as the 'recruitment group.'

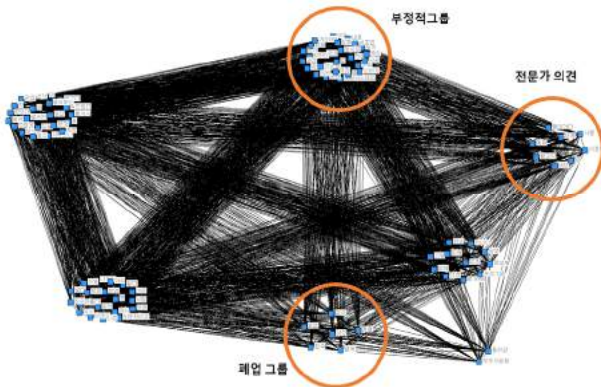
During 50 days after the broadcast, a total of 7 groups were created, and there were additional 'negative groups', with the similar size to the positive groups, containing the key words of 'recipe', 'reality', 'reveal', 'truth', 'dispute', and 'recipe'. Besides, 'shut down group' with a considerable size was created while having the key words of 'shut down,' 'business owner', 'sales' and 'finally', and unusually, 'specialist's opinion group' containing the words of 'Hwang, Gyo-ik', 'use', 'cooking oil', 'butter', 'quantity' and 'used' was created with the similar size to that of the 'shut down group'. Through this, we could find out that there were growing number of specialists, including the food columnist Hwang, Gyo-ik, who criticized the excessively biased and distorted Food X-file, after the broadcast.

In addition, we have analyzed the connectivity of major words collected for 50 days, before and after the broadcast. As a result, it was analyzed that the positive key words, such as 'good restaurant', 'sell', 'bought and ate', 'many', 'popularity', 'line' and 'hot,' had a very strong connectivity while playing a major role, and the small number of negative words such as 'Food X-file', 'dispute' and 'broadcast' had a low connectivity.

On the other hand, during 50 days after the broadcast, comparing to the first 50, the negative key words such as 'dispute', 'cooking oil', 'Food X-file', 'broadcast', 'food' and 'shock' had a stronger connectivity than that of the positive key words, and they were becoming the main key words.



Picture 3 Result of Analyzing convergence of iterated correlation before broadcast



Picture 4 Result of Analyzing convergence of iterated correlation after broadcast

Table 8 Current groups created by analyzing convergence of iterated correlation before broadcast

Positive evaluation group	Giant castella, bought and ate, delicious, taste, fresh cream, bread, have, good restaurant, today, line, soft, served, popularity, many, make, price, house, tasting, hot, good, postscript, person, in line, place, trend, sell, open, thought, time, original, language, store, hello, like, road, originator, sell, recommendation, snack, Korea, go in, town, location, first time, size, boy, blog, travel, near, Busan, cheese, pass, egg, bakery, put in, milk, purchase, this time, Naver
Recruitment group	Part-time job, recruitment, gender, close of the subscription, part-timer, age
Startup group	Recent, giant castella, startup, shop, nationwide, brand, Daejeon, cooking oil
Trailer group	Shun down, society, dispute, broadcast, truth, food, Food X-file

Table 9 Current groups created by analyzing convergence of iterated correlation after broadcast

Positive evaluation group	Good restaurant, thought, taste, hot, like, have, soft, in line, line, good, Korea, first time, bought and ate, today, food, fresh cream, unwaresly, ate, delicious, gallery, house
Negative evaluation group	Report, center, contents, reality, manufacturing method, open, recipe, domestic, reveal, topic, popularity, process, Food X-file, recent, work, shop, this time, dispute, giant castella, shock, consumer, secret, fact, manufacturing, truth
Specialists' opinion	Go in, problem, use, cooking oil, quantity, butter, Hwang, Gyo-ik, egg
Shut down group	Business owner, shut down, president, sales, shop owner, finally
Other 1	Served, price, sell, reason, person, hello, franchise, trend, brand, news, after, put in, store, milk, startup, bread, many, general, make
Other 2	Broadcast, pass, part, Channel A, program, food, reporter, business, accusation, damage, after
Other 3	Clie, park for all

6 Conclusion

The social roles of broadcasting are diverse such as delivery of information and advertisement of products. Television, which used to be owned per one household, has become a necessary item for each room, and the mobile phones that we carry all the time allow us to have an access to broadcasting at any time and place. If broadcasters do not contribute to the publicness, fairness and the national welfare, and release wrong information and exaggerated advertisement, the society will be in chaos.

It is desirable to give a freedom to the broadcast programs as a measure of guaranteeing a freedom of expression. However, it does not include the freedom of damaging others. To improve the publicness and fairness of broadcasting, and the national welfare, we will have to regulate the broadcasted programs properly while guaranteeing a freedom of expression. In Korea, it is prescribed by the law that broadcast programs should be self-screened as an advance measure, and that the possible victims have the rights of claiming for a correction report, objection report, ex post facto report, and compensation for damage, as a follow-up measure. However, the advance measure has a limit as it is done by the broadcasters themselves, and the follow-up measures, such as the right of claiming for a correction report, cannot be effective on compensating the damage of victims as the broadcasting system tend to stigmatize the issues.

According to the analysis result of this paper, the influence of broadcasting is huge on food industry. Although we could not analyze the direct influences, we have found out that the objectivity and fairness of broadcasting should be secured by researching on how it changes the recognition for food. In the contemporary society, where information is delivered and reproduced more rapidly than the past, it is not a good idea to regulate the broadcast contents with the standard of the past. Considering the huge influence on the industrial ecosystem including that of food, we need different approaches comparing to that of the past. Followings are the alternatives for minimizing the number of regulations, while avoiding pre-censorship. First, when taking a self-screening as an advance measure, we should include the specialists for broadcast contents in the review evaluation group. In addition, let the 3rd parties participate in the evaluation group so that they can evaluate the broadcast contents objectively. In the process of screening, we should increase the fairness of broadcasting by introducing the system that can verify the facts and evaluate the influence of broadcasting. In addition, the government should provide the broadcasting companies and productions with a guideline to strengthen the fairness and publicness of broadcasting, and operate the programs designed to raise their sense of ethics. Speaking of the follow-up measures, we have to prescribe the contents, time and number of times for correction report to increase the effectiveness of the rights, including that for a correction report.

For example, by allotting 5 minutes to the major news hours of each broadcasting company, we can reveal the fact relation, explain about the corrected contents, and propose a measure for recurrence prevention. In the current law for press arbitration and damage relief, it is prescribed that less than 30 million won of penalty will be imposed to the person who did not broadcast or report the corrected news. Apart from this penalty, by considering the ripple effect on the society and adding a punishment for causing social chaos, we have to impose them a punitive fine. When imposing a punitive fine, we should consider the degree of social damage caused by 1. contents and degree of the offence, 2. period and times of it, and 3. offence itself.

The damages, which is caused by the broadcasters already, are hard to be compensated because of the stigmatizing effect of broadcasting system. In this circumstance, it is too much for the victims to prove the responsibility of civil damage compensation for the offence. Therefore, by imposing the burden of proof for offence to the producers, we can protect the victims. Broadcasting

business operators should pay for the damage to the victims while having a civil responsibility. In addition, in case of Korea, the system is separated into two parts, one is the Korea Communications Commission which sets up a policy for broadcasting, and the other is the Korea Communication Standards Commission which regulates the contents. These two organizations should be unified considering their efficiency and integration of policy and regulation. If the regulations stated above are realized, the broadcasters will be able to contribute to social welfare by improving their publicness and fairness.

The first limit of this study is that we had to use English emotional word dictionary and subjective evaluation standard of the researchers, because we did not have a standard Korean emotional word dictionary. As we do not have an alternative for solving this problem, the research could be more meaningful if sentiment analysis is performed based on more strict standard through researching on the Korean version of emotional word dictionary. Second, as the incident of giant castella is a recent one, we had to set up a period of 50 days, which is relatively short, and as a result, there were unnecessary or less relevant words in the analysis result as we tried to minimize the number of deleted material in the process of filtering. In the future, it will be necessary to extend the research period, and analyze the data with a more strict filtering process. In addition, if additional debates are performed through verifying other examples, it will contribute to the generalization of research results.

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