J. Internet Comput. Serv.
ISSN 1598-0170 (Print) / ISSN 2287-1136 (Online)
http://www.jics.or.kr

Exploratory Study on the Media Coverage Trends of Personal Information Issues for Corporate Sustainable Management☆

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ABSTRACT

Information power has been a major criterion for wealth disparity in human history, and since the advent of the Fourth Industrial Revolution, referred to as the data economy era, personal information has also gained economic value. Additionally, companies collect and analyze customer information to use as a marketing tool, providing personalized services, making the collection of quality customer information crucial to a company's success. However, as the amount of data held by companies increases, crimes of stealing personal information for financial gain have surged, making corporate customer information a target for criminals. The leakage of personal information and its circumstances lead to a decline in corporate trust from the customer's perspective, threatening corporate sustainability with falling stock prices and decreased sales. Therefore, companies find themselves in a paradoxical situation where the utilization of personal information is increasing while the risk of personal information leakage is also growing. This study used the news big data analysis system, BIG KINDS, to analyze major keywords before and after media coverage on personal information leaks, examining domestic media coverage trends. Through this, we identified the impact of personal information leakage on corporate sustainability and analyzed the connection between personal information protection and sustainable corporate management. The results derived from this study are expected to serve as foundational data for companies seeking ways to enhance sustainable management while increasing the utilization of personal information.

☞ keyword : Personal Information Leakage, Personal Information Protection, Corporate Sustainability, BIG KINDS

1. Introduction

Information power has been a major criterion for seizing opportunities throughout human history, such as winning wars and successful investments. Since the Fourth Industrial Revolution, the data economy era has arrived, various data have begun to be referred to as the oil of the 21st century, giving personal information economic value. Accordingly, companies have been able to secure the latest information generated externally through big data technology and strive to provide better services by combining it with data within the company to preemptively understand customer behavior[1]. When companies collect customer information as external information and use it as a marketing tool to provide personalized marketing, the company's profits increase. For example, KT Group's internet subsidiary KTH's T-commerce K Shopping saw viewership increase by 31.8% and purchase rate by 34.5% via broadcasting products matching consumer preferences through big data analysis[2]. As such, providing personalized services requires various customer information, and the success of a company is determined by the quality of personal information collected. However, as the collection of quality personal information increases, the influx of cybercriminals, such as hackers, also increases.

As internet technology advances and the value of data rises, along with the data held by companies, including customer personal information, increasing, cases of stealing personal information for criminal use are increasing.

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[Received 27 May 2024, Reviewed 29 June 2024, Accepted 11 July 2024]
☆ This research was supported by the Chung-Ang University Graduate Research Scholarship in 2024 and grant funded by the Korea government(MOE) (2024 government collaboration type training project[Information security field], No. 2024 personal information protection-006).
☆ A preliminary version of this paper was presented at ICONI 2023.

According to data submitted by the Korea Internet & Security Agency (KISA), the number of reported personal information leakage cases increased more than sevenfold from about 1,000 cases in 2019 to over 7,000 cases in 2021, and the number of consultations on personal information leakage is also increasing annually. As successful hacking can obtain vast amounts of personal information, corporate customer information servers become targets of crime. In fact, there are many attempts to steal corporate customer information, and cases of leakage leading to financial damage have also been confirmed. The problem is that the circumstances of personal information leakage accidents, as well as the accidents themselves, affect corporate sustainability by causing stock prices to fall or customers to decrease. Companies collect personal information to expand profits, but at the same time, they face such a paradoxical situation.

(Table 1) Reported and Consulted Cases of Personal Information Leakage(3)

	2019	2020	2021	Total
Reported	1,041	1,091	7,844	9,976
Consulted	158,214	176,366	202,923	537,503
Total	159,255	177,457	210,767	547,479

Therefore, this study aims to derive the connection between corporate sustainability and personal information protection. To this end, we selected companies for analysis and using the news big data analysis system BIG KINDS, we analyzed the main keywords before and after media coverage on personal information leakage. To visualize the impact of personal information leakage on companies, we conducted keyword trend and word cloud analysis. Through this study, we confirmed the impact of personal information leakage accidents on media coverage trends and identified the influence of personal information protection on corporate sustainability. The results are expected to provide a foundation for future research on protecting personal information from the perspective of corporate sustainability, considering the increasing utilization of personal information.

2. Theoretical Considerations

2.1 Concept and Scope of Personal Information

Personal information may be expressed differently by country or mixed in meaning, causing confusion in terminology. Depending on the user and usage situation, terms such as Personal Data, Personal Information, Personally Identifiable Information are used interchangeably, and expressions representing personal information protection vary, including Information Privacy, Data Privacy, Data Protection, Privacy Protection, and Information Security. However, they commonly include elements such as guaranteeing individual rights, securing safety measures, and legal considerations. The Korea Personal Information Protection Commission and government agencies use the term Personal Information Protection in English for the Personal Information Protection Act, and this study uses ‘Personal Information Protection’ following domestic data.

Personal information protection is regulated by various laws by country, and each law sets the definition and scope of personal information. According to Article 2 of the Personal Information Protection Act of South Korea, “Personal Information” is defined as information about a living individual that can identify the individual through name, resident registration number, image, etc. (including information that can be easily combined with other information to identify an individual even if the information alone cannot identify the individual). The Korea Internet & Security Agency (KISA) Personal Information Protection Portal defines personal information according to the Information and Communications Network Act as information about a living individual that can identify the individual through symbols, letters, voices, and images. The GDPR (General Data Protection Regulation) of Europe defines personal information as any information related to an identified or identifiable natural person, including name, identification number, location data, and information related to social, economic, and cultural identity. The California Consumer Privacy Act (CCPA) in the United States defines personal information as information that can identify a specific consumer, including name, address, location data, and job information, and is broadly applied depending on the type

of data collected by the company. Thus, personal information shows differences in approaches depending on regional and cultural contexts, so this study followed the examples of the Personal Information Protection Act and the Information and Communications Network Act.

2.2 Personal Information Protection and Corporate Sustainability

The rapidly changing society due to the Fourth Industrial Revolution, the outbreak of COVID-19, and the climate crisis has led to quick changes in the environment companies face, making sustainability a key issue for companies. Accordingly, ESG, expressed as Environmental, Social, and Governance, is used as a strategy to gain a competitive advantage by forming a fair perception of prices through corporate image formation, even though these activities are not directly related to the pricing of products or services[4]. Additionally, Park Jong-chul and Lee Kwang-hyun (2009) found that corporate ESG activities improve customer satisfaction through mediated trust in corporate expertise and goodwill, implying that ESG activities contribute to securing corporate sustainability[5].

The concept of sustainability was first introduced in 1987 by the World Commission on Environment and Development (WCED) of the United Nations in the report “Our Common Future” as “sustainable development.” The Dow Jones Sustainability Index (DJSI) defines sustainability as a business approach that creates long-term shareholder value by capturing opportunities and managing risks through economic, environmental, and social development[6]. Recently, the concept of sustainability and sustainable development has been limited to environmental sustainability due to its connection with environmental issues. However, this study uses sustainability in the context of corporate continuity in the future.

Personal information protection is being addressed as a sub-item of ESG. With the enactment of regulations such as the GDPR in Europe and the CCPA in California to strengthen consumer personal information protection, and as digital transformation accelerates, corporate data holdings face increasing threats, making personal information protection a risk management item for companies. In this context, movements to include information security in ESG criteria, emphasizing personal information protection, are emerging.

The Nasdaq includes ‘Data Privacy’ in its ESG disclosure area, requiring companies to indicate compliance with data privacy policies and GDPR rules[7]. The K-ESG Guidelines published by the Ministry of Trade, Industry and Energy include information protection system construction and personal information infringement and remedies in the social (S) assessment items[8]. Lee Geun-ho (2023) emphasized that information protection education falls within the social domain of ESG management and proposed an ESG-based information protection education model[9]. Furthermore, reinforcing corporate security to enhance corporate sustainability pursued by ESG management is being discussed from the perspective of mandatory evaluation elements. Choi Sun-young and Jeong Ji-won (2022) proposed reasons to consider industrial security from the perspective of enhancing the soundness of the industrial ecosystem for corporate sustainability within ESG management[10]. However, previous studies have limitations in understanding the direct impact of personal information leakage incidents on corporate sustainability, as they address personal information protection as a sub-item of ESG. Therefore, this study aims to identify the connection between corporate sustainability and personal information protection by examining the impact of personal information leakage incidents on media coverage trends.

2.3 BIG KINDS Analysis Method

BIG KINDS is a news analysis service provided by the Korea Press Foundation, which has created a big data repository of about 100 million news contents from 104 media outlets since 1990[11]. The analysis targets include articles from various media such as comprehensive daily newspapers, broadcasters, regional daily newspapers, and economic newspapers. It consists of a news collection system, analysis system, and storage system, transforming unstructured text into structured data to provide meaningful information for social phenomenon research. The stored analysis information is accessible, increasing accessibility for the public, media, and academia, allowing them to utilize the data for specific issue trend analysis and related word analysis.

The process of analyzing news with BIG KINDS generally

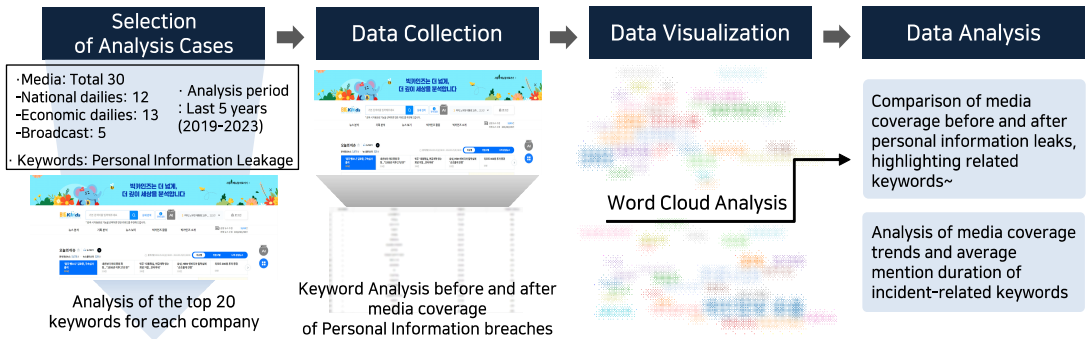
consists of three steps: ‘setting search conditions, adjusting search result range, and visualizing data.’ In the first step, users can set institution and media settings to configure user-defined search formulas. In the second step, various search filters are used to narrow the search result range. In the final step, keywords trends, relationship analysis, and related word analysis are conducted based on the filtered news data[12].

Therefore, BIG KINDS analysis converts news content into analyzable data, providing foundational data for analyzing social phenomena and enabling topic derivation and scope expansion based on the analysis data. Ha Dong-yeop (2023) analyzed changes in media coverage of teacher rights violations centered on daily newspapers, confirming that the issue of teacher rights violations is becoming prominent in society[13]. Kwag Hee-jong (2022) analyzed keyword and network analysis targeting regional daily newspaper headlines, highlighting differences in redevelopment and regeneration project issues between metropolitan and regional areas, suggesting the need for policy improvements and regional case sharing in urban regeneration policies[14]. Additionally, Kim Do-hoon, Park Jung-woon, and Lee Bong-kyu (2021) used five-year news data on bakery ingredients to identify bakery trends[15]. BIG KINDS analysis, through keyword analysis, network analysis, and text mining techniques, is effective for understanding relationships and frequency of word occurrences, identifying major issues and trend changes.

Research on media coverage and corporate image is continuously conducted in various fields such as business and broadcasting studies, as the impact of media coverage and corporate image is directly related to corporate profits, garnering attention and management from both academia and businesses[16]. Additionally, Choi Eun-bi and Kim Hyo-sook (2011) analyzed the impact of media coverage tone and involvement types on public consciousness, concluding that negative media coverage has a greater impact on public organization perception than positive coverage[17]. Thus, mass media significantly influences public perception of social atmosphere, ultimately changing public behavior[18]. Considering that corporate image significantly affects corporate performance, it is inferred that corporate image formed by media coverage can influence corporate performance[19]. Therefore, analyzing news data using BIG KINDS is effective in understanding the correlation between personal information protection and corporate sustainability aimed in this study.

3. Research Method

This study conducted news big data analysis to longitudinally compare corporate media coverage patterns before and after personal information leakage incidents to identify their impact on corporate sustainability. The research analysis method consisted of case selection, data filtering and collection, and data analysis, and used domestic media coverage to utilize the BIG KINDS analysis system provided by the Korea Press Foundation.



(Figure 1) Data Collection and Analysis Method

3.1 Data Collection

To select the companies for analysis, related word analysis was conducted with ‘personal information leakage’ as the core keyword for five years from January 1, 2019, to December 31, 2023. Data were collected from 12 national daily newspapers (Kyunghyang Shinmun, Kukmin Ilbo, Naeil Shinmun, Dong-a Ilbo, Munhwa Ilbo, Seoul Shinmun, Segye Ilbo, Asia Today, Chosun Ilbo, JoongAng Ilbo, Hankyoreh, Hankook Ilbo), 13 economic daily newspapers (Daily Economic, Maeil Business Newspaper, Money Today, Metro Economy, Bridge Economy, Seoul Economic, Asia Economy, Aju Economy, E-Today, Financial News, Hankook Economic, Herald Economy, E-Daily), and 5 broadcasters (KBS, MBC, OBS, SBS, YTN) provided by the BIG KINDS search engine. Through this analysis, the top 20 keywords with high relevance to the analyzed news were extracted, and companies included in these keywords were selected. After that, the yearly keyword trends were analyzed to determine the year with the highest number of coverage related to ‘personal information leakage,’ using the year with the maximum number of media coverage as the reference year.

3.2 Data Analysis

The companies selected for analysis were set with the same analysis period(from January 1, 2019, to December 31) and media(total of 30) as when selecting the analysis companies, and to visibly observe changes in media coverage due to personal information leakage, the year with the most active media coverage related to personal information leakage and the previous year were confirmed. Word cloud analysis was conducted to identify the weight and frequency of texts appearing in connection with the company name, using the BIG KINDS built-in algorithm for weighting and confirming results based on the frequency of related keywords. Through this, newly emerging keywords related to personal information leakage were identified, and the proportion of these keywords in media coverage was analyzed by period to confirm changes in media coverage. This analysis allowed for the identification of the duration for which changes in media coverage due to personal information leakage persisted.

4. Research Results

4.1 Analysis of Selected Companies

The analysis of media coverage with ‘Personal Information Leakage’ as the core keyword from January 1, 2019, to December 31, 2023, resulted in a total of 10,378 cases. The keywords with high relevance to personal information leakage in the media coverage text were listed based on weight and frequency. As a result of extracting only keywords corresponding to company names among the top keywords, it was confirmed that three companies were highly related to media coverage on personal information leakage, as shown in Table 2. The companies were de-identified and written as ‘A’, ‘B’ and ‘C’.

(Table 2) ″Personal Information Leakage″ Word Cloud Analysis Results

Rank	Keyword	Weight	Frequency
1	A	48.15	357
14	B	14.95	144
17	C	13.58	155

To identify the period with the most active media coverage related to personal information leakage for the three companies, the keyword trend analysis system provided by BIG KINDS was used. By mediating the company name and personal information leakage (input value: “company name” AND “Personal Information Leakage”), the yearly reporting trend was identified. For ‘A’, the input value was set to (“A” AND “personal information leakage”), for ‘B’ (“B” AND “Personal Information Leakage”) and for ‘C’ (“C” AND “Personal Information Leakage”).

The analysis results showed that for ‘A’, a total of 611 cases were reported, with 431 cases in 2023 being the highest. In January 2023, customer personal information of about 600,000 cases was disclosed on illegal trading sites due to hacker attacks, and 287,177 cases of personal information leakage were confirmed, including 26 items such as phone number, name, and address, resulting in a fine of 6.8 billion won the same year, continuing the issue of personal information leakage[20].

For ‘B’, a total of 88 cases were reported, with 29 cases

(Table 3) Keyword rank by company

Rank	'A' keyword	'B' keyword	'C' keyword
1	Business agreement	Covid19	Instagram
2	KT	Special Exhibition	SNS
3	Personal information	**Personal information leakage**	User
4	SKtelecom	Coupang	**Personal information**
5	**DDoS attack**	Promotion	YouTube
6	Mobile Virtual Network Operator	Supreme court	Google
7	AI	Deficit Conversion	Libra
8	Users	Subsidiary company	WhatsApp
9	OTT	Shareholder value	CEO
10	Electric vehicle charging	Discount benefit	Cryptocurrency

in 2020 being the highest. 2016 hacking incident of 'B' led to the leakage of more than 10.3 million customer information, and in November 2020, a court ruling ordered compensation of 100,000 won per member, causing the previous personal information leakage incident to resurface[21].

For 'C', out of 1,128 cases, 447 were reported in 2019. 'C' faced issues of personal information management negligence due to the incident of Cambridge Analytica using personal information of 87 million 'C' users during the 2016 US presidential election, leading to the imposition of maximum fines by the US Federal Trade Commission (FTC)[22].

4.2 Word Cloud Analysis

The period with the highest number of media reports related to personal information leakage for each company was set as the reference year, and the text in the media coverage with the highest frequency of occurrence was extracted. Among the extracted keywords, nouns confirmed to be related to personal information leakage through relevant keyword analysis were selected and their differences were compared. The results are shown in Table 3 and Figure 2,3,4.

First, for 'A', in 2022, the keyword 'business cooperation' showed the highest connection, indicating that media coverage focused on efforts to increase customer convenience through business collaborations. Additionally, the 'Hope Library' project to build libraries for visually impaired youth in blind schools, and the 'Smart Factory' project to enhance productivity and competitiveness by building AI smart factories for SMEs were also highly connected. However, in 2023, when the personal information leakage incident occurred, negative keywords such as 'DDoS attack' and 'personal information,' which were confirmed to be connected to the personal information leakage incident. The keyword 'user' was also found to be related to the personal information leakage in the analysis of relevant keyword with 'A', indicating a change in the pattern of media coverage due to the personal information leakage incident.

For 'B', in 2019, the 'insaengnal' event conducted by 'B' was the most related to media coverage of 'B', and keywords such as 'sales' and 'operating profit,' which assess the company's financial value, were also highly reported. However, in 2020, 'personal information leakage' showed the highest connection, indicating that the personal information leakage incident was prominently reported in the media.

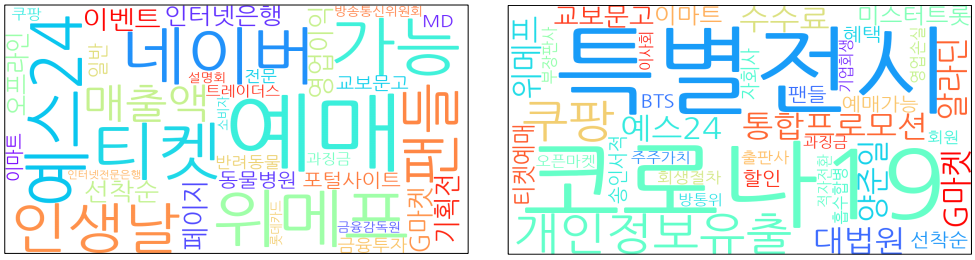
For 'C', the reference year was set as 2019, but considering the series of personal information leakage incidents from 2018, the comparison year was analyzed as 2017. In 2017, 'C' CEO Mark Zuckerberg's congratulatory message on President Moon Jae-in's inauguration was widely introduced by various media. Additionally, 2 billion users of 'C' in the first half of 2017 and its third-quarter performance exceeding market expectations were also widely reported. In 2019, after the personal information leakage incident, the keyword 'personal information' newly appeared, confirming changes in media coverage trends.

To verify the duration of keywords that emerged after personal information leakage incidents, quarterly word cloud analyses were conducted after the reference year. News data were filtered using company names, and keywords were listed based on weight and frequency to analyze the duration of

2019년 2020년

(Figure 2) 'A' Word Cloud Analysis

2022년 2023년



(Figure 3) 'B' Word Cloud Analysis

2017년 2019년

(Figure 4) 'C' Word Cloud Analysis

keywords related to personal information leakage.

The analysis results showed that for 'A', the keyword 'personal information' appeared in the top rankings for three months after the reference year, and keywords indicating cyber breaches such as 'DDoS attack' were also confirmed to be included in the top 10.

(Table 4) 'A' Keyword Persistence Period

Company	'A'	
Period	Rank	Keyword
2023.01-2023.12	3	Personal Information
	5	DDoS Attack
	8	User
2023.01-2024.03	4	Personal Information
	10	DDoS Attack
	18	User

For ‘B’, ‘personal information leakage’ appeared as the third-ranked keyword throughout 2020 and remained within the top 10 until the fourth quarter of 2021.

(Table 5) ‘B’ Keyword Persistence Period

Company	‘B’	
Period	Rank	Keyword
2020.01-2020.12	3	Personal Information Leakage
2020.01-2021.03	2	Personal Information Leakage
2020.01-2021.06	3	Personal Information Leakage
2020.01-2021.09	9	Personal Information Leakage

For ‘C’, ‘personal information’ fell out of the top 5 by the second quarter of 2020 but reappeared in the top 5 by the fourth quarter of 2020. This analysis is due to the continuous occurrence of personal information leakage incidents after 2019.

(Table 6) ‘C’ Keyword Persistence Period

Company	‘C’	
Period	Rank	Keyword
2019.01-2019.12	4	Personal Information
2019.01-2020.03	4	Personal Information
2019.01-2020.06	7	Personal Information
2019.01-2020.09	9	Personal Information

By confirming the duration of keywords related to personal information leakage, it was derived that personal information leakage incidents occupy a significant portion of company-related news in the media and that this portion lasts for an average of six months, even if the incident is a one-time occurrence.

5. Conclusion

This study explored the impact of personal information protection on corporate sustainability by analyzing media coverage patterns before and after personal information leakage incidents. Using the BIG KINDS system, news big data were analyzed, visualizing the impact of personal information leakage on corporate media coverage through keyword trend and word cloud analysis.

The cases of ‘A’, ‘B’ and ‘C’ confirmed changes in media reporting trends due to personal information leakage incidents, increasing keywords related to the incidents. Considering the influence of media coverage on public opinion, it was inferred that such coverage negatively affects corporate reputation.

Additionally, keywords that emerged due to personal information leakage incidents persisted for an average of six months, indicating that personal information leakage incidents are not one-time issues but have long-term negative impacts on corporate image and trust. This negative influence can lead to customer and sales decline, adversely affecting corporate sustainability. Therefore, personal information protection should be recognized as an important risk management item for companies.

This study has limitations in the data collection process. The analysis scope was limited to domestic media coverage and three corporate cases, making it difficult to derive general results. Additionally, there was a lack of analysis on quantitative data objectively reflecting the impact of personal information leakage on actual corporate sales or stock prices. To supplement these limitations, future research aims to expand the analysis data scope and analyze quantitative data together to clarify the impact of personal information protection on corporate sustainability.

Despite these limitations, this study is significant in deriving the direct connection between personal information protection and corporate sustainability, emphasizing the importance of personal information protection. It is expected that this study will serve as foundational data for devising utilization measures considering corporate sustainability amidst increasing utilization and importance of personal information.

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