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Analysis of the Present and Future of the Korea Online Platform Regulation Using Latent Dirichlet Allocation

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ABSTRACT

Purpose: This study was conducted to provide a comprehensive understanding of online platform regulation in South Korea. It aims to illuminate key issues related to online platform regulation from 2017 to 2021, exploring the current state and future prospects. The primary goal is to foster social discourse on online platform regulation and to offer valuable insights for policymakers and academics.

Design/methodology/approach: The methodology involved collecting articles from a large news database using keywords associated with online platform regulation. This data was analyzed using Latent Dirichlet Allocation (LDA) topic modeling. This technique is instrumental in identifying themes and patterns within large volumes of text data, facilitating the identification of significant themes and trends related to online platform regulation.

Findings: The study unearthed a variety of themes. Among the most significant are the impact of the COVID-19 pandemic and its ramifications, political aspects, the roles of major Korean corporations (e.g., Naver and Kakao), the influence of global tech giants, the impact of news and online communities, technology and innovation, and social issues. These themes indicate that online platform regulation in Korea is influenced by a multitude of factors.

Research limitations/implications: While this study offers diverse perspectives on online platform regulation within Korea, it has limitations. Reliance on data from a single news source may restrict the study's diversity and depth. Future research should employ a variety of news sources to provide a broader perspective on online platform regulation.

Originality/value: This research makes a significant contribution to the academic study and policy formulation in the field by analyzing the key themes and trends related to online platform regulation over time. By exploring the complex aspects of online platform regulation, the study provides new insights for policymakers, researchers, and the general public.

Keywords: Online platform, Platform regulation, News data, Topic modeling, Latent Dirichlet Allocation

I. Introduction

The Internet, which emerged with the development of information and communications technology (ICT),

is dramatically changing not only global industrial and economic growth but also the way people live (Commission, 2016). The global growth of online platform companies poses a significant threat to big tech companies. They have allowed online platforms to assume the roles of god-like gatekeepers, legislators, judges, and juries because of their enormous economic value and innovation (Cutolo et al., 2021); now is

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the time for change, and there are growing calls to regulate this powerful dominance. In particular, the transition to a non-face-to-face society owing to the COVID-19 outbreak in 2020 led to the explosive growth of online platform services (Yu, 2023). The transaction amount of vertical commerce platforms such as "Musinsa" (fashion), "Market Kurly" (food), and "Must It" (luxury) was 5,887.3 trillion in 2021, which is a 33.5% increase from the previous year (Korea, 2021b). According to PwC's "Global Top 100 companies by market capitalization," five out of 10 global companies in 2019 are big tech companies that operate platform businesses (PwC, 2019). Compared with 2009, when only Microsoft and Alphabet were involved, it can be seen that there is a rapid increase in the influence of online platform companies on the world. Korea's online shopping transaction amount is 17.5 trillion (Korea, 2021a). The reason for such significant economic value is that online platforms span various fields and have established "themselves as essential means, tools, and mediums" in our daily lives (Lee, 2021), with their influence expanding offline as well, thanks to the online-to-offline (O2O) business model adopted by several platforms.

Digital markets, such as Internet platforms, have a winner-takes-all structure with high entry barriers and market concentration because of characteristics such as network effects, conversion costs, and economies of scale (Gawer and Cusumano, 2014; Judiciary, 2019; Walker, 2020). Therefore, countries worldwide have made efforts to enact laws and guidelines to prevent competition and consumer rights from being infringed by the anti-competitive behavior of related business operators, despite the economic utility and practical benefits of digital platforms (Forum, 2019). In South Korea, as online consumption increases in the aftermath of the long lasting COVID-19 pandemic, the controversy over unfair trade between online platforms and small offline businesses continues, and there is an emerging need for regulatory measures to protect them. Although the "Online Platform Intermediary Transactions Fairness Bill" has not been enacted in the National Assembly in Korea, a

consensus has been reached between the ruling and opposition parties on platform regulation, and it is expected that the regulations will be applied to the IT industry as a result of an agreement between the Fair Trade Commission and the Korea Communications Commission. There are conflicting opinions about the Bill in Korea. Opinions in favor of protecting small offline businesses and those in favor of the online platform industry concerned about excessive regulation are in conflict (Cheong, 2021; Walker, 2020). More than half of the consumers oppose online platform regulations. The Consumer Awareness Survey on Online Platform Delivery Service Regulations published by the Korea Startup Forum in February 2021 revealed that 61.4% opposed online platform regulation¹⁾. Among the problems with online platforms, the frequently mentioned commission structure is only the tip of the iceberg (Cutolo et al., 2021). The fundamental problem is that vendors cannot compete freely on online platforms, and even if they release innovative products, platform companies can eventually gain a competitive advantage by offering their own products (Cutolo et al., 2021). This is because platform companies have data not only from vendors but also from consumers, which is advantageous for expanding various service models and allowing them to promote their own products first, through advertisements (Lee et al., 2022). The issue of unfair behavior due to the monopoly of data by such large platform companies is starting to draw attention as a social problem (Kim and Lee, 2021). In addition, the power of platform companies is strengthened by competitive strategies, such as M&A, zero pricing, typing, and predatory pricing (Kim et al., 2021). In response, some experts state that the problems of specific online platforms should not be generalized, others say that they should not be duplicated (Lee, 2021), and still others say that competitive strategies should not be misinterpreted (Kim et al., 2021). This is because objectively measuring the impact of platform company strategies on consumers

1) "Startup organizations" online platform regulation, question about the effect of protecting local commercial areas, Yonhap news, 2021.02.22. <https://www.yna.co.kr/view/AKR20210222034500017?input=1195m>

and industries is difficult. Therefore, the regulation of online platforms is complex (Akman, 2021; Colangelo and Zeno-Zencovich, 2016). Dealing with online platform issues requires a multipronged approach. This is because the issues change over time due to diverse stakeholders and services and their innovative nature (Kim, 2021). Platforms that fall under the category of online platforms are diverse. Korea's representative online platform services include open markets, delivery apps, lodging apps, riding apps, real estate, and used car information provision services. Considering these characteristics, regulations for platform companies should be established and operated for each common issue.

Accordingly, this study examined issues related to online platform regulation from various perspectives and examines important issues that have emerged over time. The study period was from 2017 to 2021, when online platform regulations were recommended. The research method used was Latent Dirichlet Allocation (LDA), which is a text mining technique that collects news data with keywords related to online platform regulation. The purpose of this study was to systematically capture the social changes caused by online platform regulation and discover topics for social discussion. LDA, an exploratory research method, is suitable because online platforms have a wide range of services, and are subject to large changes over time. News data were selected as the subject of analysis in this study because news is a representative medium for understanding issues that have received attention from the public in a specific era. In addition, the collected data are vast and unstructured, and it is possible to extract and process useful information from unstructured or semi-structured text data based on natural language processing technology, as well as to understand the relationship between texts (Paranyushkin, 2011). This approach helps identify the current trends of online platform regulation over a short period and also aids in predicting future trends from a long-term perspective. This study raises the following research questions:

Research Question 1. What are the major keywords concerning online platform regulation?

Research Question 2. What are the main issues among these keywords?

II. Review of Related Research

A. Concept and Current Status of Online Platform Regulation

Online platform regulation aims to protect consumers, platform vendors, and individual companies from unfair market competition (Commission, 2020). The Online Platform Intermediary Transactions Fairness Bill aims to regulate unfair trade practices and protect small and medium-sized enterprises (SMEs). Consequently, many European Union (EU) rules, for online platforms, with similar legislative purposes have been borrowed (Jang, 2021). For instance, the bill mandates platform companies to transparently disclose transaction terms to vendors and publish key contractual items to prevent disputes, such as the period, change, renewal, and termination of brokerage contracts; the content, period, and price of online platform brokerage services; and the commencement, limitation, suspension, change, etc., of brokerage services. However, there is criticism that currently proposed online platform regulation-related laws do not specifically address the need for economic regulation, and a more thorough investigation is required because there is a risk that the laws can be applied in a uniform manner by generalizing the problems of specific online platforms, and it is difficult to avoid overlapping regulations (Lee, 2021). The scope of online platform regulation varies depending on how legislation defines an online platform. An online platform is defined as "Internet homepages, mobile applications, and equivalent electronic systems for the purpose of interaction such as transaction of goods or services and information exchange between two or more groups of users" in Article 2 of the Online Platform Intermediary Transactions Fairness Bill. However, online shopping malls that sell directly, social media with no transactions, and customer-to-customer (C2C) platforms that provide

second-hand prices between individuals are excluded. The Organization for Economic Co-operation and Development (OECD) defines an online platform as "a digital service in which two or more users (companies or individuals) interact with each other that are clearly distinct and interdependent online." In the United States and the EU, the subject of regulation differs according to law. Unlike the U.S., which is restricted to Google, Apple, Facebook, and Amazon (GAFA), the EU has a comprehensive online platform approach. The EU's online platform regulation law divides online platform operators into "online brokerage service providers" and "search engine operators" (Commission, 2020). The former refers to business operators in which direct transactions are made between users and consumers, while the latter is defined as digital service providers that provide a search term function (NARS, 2021).

The current status of online platform regulation in the EU and the United States is as follows. First, the EU is the most active in regulating online platforms. This is to monitor the U.S., which dominates the online platform market, and to increase the competitiveness of companies in the EU (NARS, 2021). The EU enacted the platform-to-business (P2B) regulation on June 20, 2019, and implemented it in 2020. The Digital Services Acts (DSA) and the Digital Market Act (DMA), collectively referred to as the DSA package, have been proposed and are under discussion (Commission, 2020). The P2B Regulation was enacted because problems with platform conglomerates, such as opaque search rankings, emerged. This has a great impact on SMEs entering into the online platform business (Choi, 2021). This regulation regulates the tyranny of platform companies by targeting online intermediation services. DSA is classified into four types: brokerage services, hosting services, online platforms, and super-large online platforms. There is a differentiated regulatory method for each stage. Through this, it aims to improve the mechanism to effectively protect the basic rights of users and strengthen the public supervision of the platform. In addition, DMA aims to address the side effects of super-large online platforms by establishing

standards for defining large-scale online platforms as "gatekeepers" (Choi, 2021).

B. Literature Review on Online Platform Regulation

The biggest characteristic of an online platform is that it is a multi-sided market (Evans and Schmalensee, 2017; Feld, 2019; Parker et al., 2016). A multi-sided market refers to a market in which two or more groups interact through a platform, and the value generated at this time is indirectly influenced by those outside the network. Therefore, defining the anti-competitive behavior of a platform cannot but involve the participants of the multi-sided platform market. Ballon and Van Heesvelde (2011) divide an online platform's main stakeholders into users and content developers. Platform operators are divided into four types: neutral, broker, enabler, and integrator platforms, according to the presence or absence of control over each stakeholder, and they argue that a differential regulatory approach is needed based on the degree of controllability. Among them, it is argued that stricter regulation is needed for the integrator platform, which controls most users and content providers. By contrast, Center (2019) emphasized that even if the social benefits of digital technology are enormous, measures to minimize the harm are necessary. Although it is true that automobiles have brought tremendous benefits in the past, traffic laws have significantly reduced the damage caused by automobiles. In Europe, where the market has already been virtually dominated by large online platforms in the United States, a strong pre-regulation method has recently been proposed (Commission, 2020). Germany and the UK have a common focus on the huge network effect in the digital market, with tipping, intermediation power, status as a gatekeeper, unbalanced bargaining power, data, and access rights issues as decisive competitive factors, arguing that some platforms cannot contest within the competitive mechanism of the market (Furman et al., 2019; Schweitzer et al., 2018). They also urged the amendment of competition

laws to respond strongly to their abuses and to speed up the recovery from competition (Kerber and Australia, 2019).

Some are concerned that the scope of application of online platform regulation is too wide and that regulatory uncertainty is growing. Online platform regulations can act inversely as a hindrance to the growth and innovation of domestic companies. We have often witnessed large-scale companies disappearing owing to market segmentation, and service and price differentiation, despite strong network effects (Belleflamme and Peitz, 2019; Evans and Schmalensee, 2007; Evans, 2017; Jullien et al., 2021). If the direction of online platform regulation is focused on the growth and development of the domestic industry, it can play an important role in strengthening the digital literacy of citizens and improving the quality of consumer consumption. In the long term, this will help the national economy by increasing opportunities in the labor market. In addition, as social participation channels diversify and social connectivity improves, startups are expected to increase.

Platform companies should also continuously provide value and benefits so that merchants do not move to other platforms. However, such as not being aware of this fact, the problem of excessive fees charged to retailers continues to arise. Apple and Google receive 30% of revenue from the App Store, Etsy receives 20 cents per item, 5% of transaction cost, and payment commission, while YouTube receives 45% of advertising revenue (Cutolo et al., 2021). The platform seeks to exercise market dominance by increasing revenue. However, participants can leverage the resources provided by the platform to develop their ability to establish strategic positions and defend. For example, retailers can reduce their dependence on platforms through multi-homing, marketing using social networks, and diversification of products or channels (Pohle, 2020).

III. Research Methods

A. Data Collection

Figure 1 shows the analysis procedure followed to answer the above research questions. First, we collected news related to online platforms from 2017 to November 10, 2021, in JoongAng Ilbo, Korea. To prevent keywords from being incorrectly reflected and omitted when searching for "online platform regulation" when collecting news data, "regulation" was used as a key keyword and additional words were combined to select keywords that fit the topic. The search terms were set to regulation (online or platform, Naver, or Kakao), and 3,9848 cases were collected. Only Naver and Kakao were included because they are Korea's representative big tech companies. As of June 2021, Kakao had 45.66 million mobile application users in the first half of 2021, which is higher than YouTube's 43.14 million. Naver ranks third at 41.06 million. Eighty-eight percent of the total population, which was 51.78 million in 2020, used online platforms. Among the 3,948 articles collected, those with different titles but with the same content were removed, resulting in 3,802 articles. LDA was performed using 3,184 articles through preprocessing.

B. Data Preprocessing

We examined the results after training the model several times during the preprocessing phase (Jun et al., 2014). Keywords such as "last year," "last month," "almost," "middle," "JoongAng Ilbo," "SoJoong," (the newspaper for children) "meantime," and "same" were treated as non-words. Subsequently, only nouns were extracted, and punctuation marks, the reporters' email addresses, and Chinese characters and English content were removed.

Looking at the data trend by period, as shown in Figure 2, it can be seen that the related discussions were concentrated from 2020, when the plan to implement the Online Platform Intermediary Transaction Fairness Bill was announced.

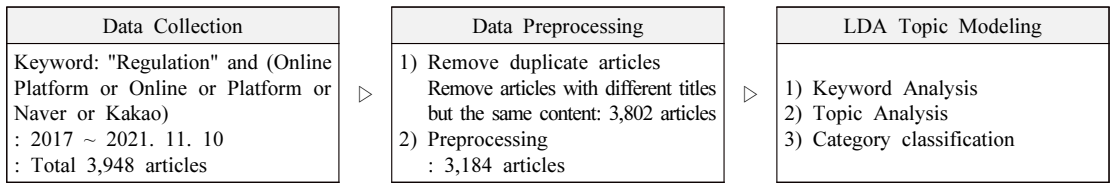


Figure 1. Overall procedure of analysis

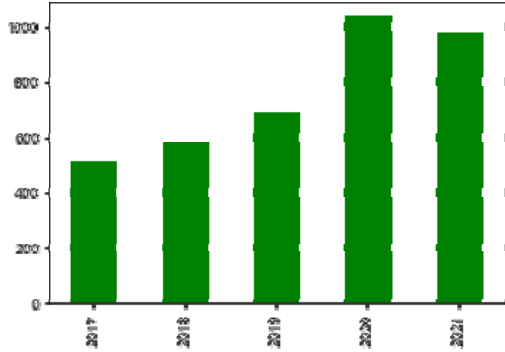


Figure 2. Amount of news data per period

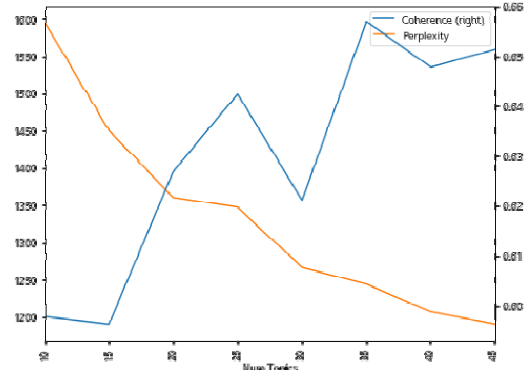


Figure 3. Coherence and perplexity score according to the number of topics

C. LDA Topic Modeling

For topics that are dynamic and change over time, such as online platforms, topic modeling with LDA is effective. LDA topic modeling is a probabilistic technique that weaves words used in a vast amount of data by topic. This is beneficial for big data analysis in that an entire document can be analyzed without a researcher labeling the data. The main assumption of LDA topic modeling is that topics exist before a document is written, from which words are extracted and written (Blei, 2012). Thus, LDA topic modeling is a method for identifying unobserved topics through an observed variable in a document. The following equation illustrates the concept of LDA topic modeling.

$$\begin{aligned}
 & p(\beta_{1:k}, \theta_{1:D}, z_{1:D}, w_{1:D}) \\
 &= \prod_{i=1}^K p(\beta_i | \eta) \prod_{d=1}^D p(\theta_d | \alpha) \\
 & \quad \prod_{n=1}^N p(z_{d,n} | \theta_d) p(w_{d,n} | \beta_{1:K}, z_{d,n}) \quad (1)
 \end{aligned}$$

To designate the n^{th} word in document d , a topic is first assigned, and then the position of the word

is determined according to the distribution of the topic. This is also well expressed in the equation, where $w_{d,n}$ is the n^{th} word in document d , β_K is the word distribution of the topic, $z_{d,n}$ is the topic of the n^{th} word in document d , α is a parameter that determines the distribution of topics, and η is the distribution of words in topics.

When determining the number of topics, researchers refer to perplexity and coherence indices as important parameters (Chang et al., 2009; Newman et al., 2010). Perplexity refers to the predictive performance of a given model. Coherence indicates the consistency of the derived topic. Therefore, the lower the degree of confusion and the higher the degree of cohesion, the better are the model results. As shown in Figure 3, 35 topics were selected in the model used in this study (coherence:0.6569, perplexity:1244.1445).

IV. Analysis and Results

A. Results of Frequency Analysis

Table 1 summarizes the frequency of each word to identify the words that appear most frequently in relation to online platform regulation in the study data. First, words such as "service," "online," "data," "internet," "digital," and "system" that reveal the characteristics of online platforms appeared. Next, "Kakao," the core company of Korea's online platform, was ranked third, and "Naver" took fourth place. Words such as "consumer," "stakeholder," "businessman," and "investor," representing the various stakeholders of an online platform appeared, and the words "President" and "Committee" related to the government regulating online platforms also emerged. In addition, the keyword "COVID-19," an assertion reflecting the COVID-19 pandemic, and "bitcoin," "startup," and "exchange," which represent innovation and technological development, appeared frequently.

B. Results of LDA Topic Modeling

Table 2 shows the results of topic modeling with the derived and labeled top 10 keywords. For example, in the case of topic 1, the topic was labeled as *local politics* based on the words "president," "democratic party," "Moon Jae In," "chairperson," "the Blue House,"

"committee," "Republic of Korea," etc. The main keywords of topic 2 were "automobiles," "electric vehicles," "Hyundai Motor," "Semiconductors," "batteries," and "eco-friendly" and was labeled *automobiles*. A total of 21 topics were derived by classifying topics closely related to online platform regulation.

C. Results of the Major Themes from LDA Topics

Table 3 shows the final analysis results classified into seven themes. The generated topics can be divided into themes such as COVID-19, politics, Naver and Kakao, global big tech companies, news and online communities, technology and innovation, and social issues. In this study, the top 21 out of the 35 topics that could be classified into seven themes were selected, and the connotations of each theme in our society were examined.

The first major theme was defined as COVID-19. Online platforms have become more established as most of our daily lives have been shifted online owing to COVID-19. This phenomenon is well demonstrated in the results of this study. Two of the 35 topics were related to online platforms. One is a topic related to COVID-19 and the medical system (Topic 9), and the other is about the self-employed and working conditions (topic 35). The two topics are labeled

Table 1. Results of the main keywords

No.	Word	Freq.	No.	Word	Freq.
1	Service	5877	11	Global	1683
2	Online	3993	12	Bitcoin	1671
3	Kakao	3530	13	Real Estate	1662
4	Naver	2876	14	President	1631
5	Data	2520	15	Committee	1630
6	Internet	2453	16	Business	1537
7	COVID-19	2312	17	Startup	1494
8	Digital	1952	18	System	1434
9	Consumer	1913	19	Stock Exchange	1417
10	Persons concerned	1757	20	Investor	1361

differently because the top 10 keywords for both are different. Topic 9 includes medical-related words such as "COVID-19," "virus," "online," "infectious disease," "digital," "post-," "treatment," "mask," "expert," and "medical staff." A few randomly selected articles

based on this topic are: "Do I have to go to the hospital myself?" "The 20-year cause" "blown away by the coronavirus," "K preventive measures ridiculed and Servant Syndrome," and "These are criticisms of the medical field related to COVID-19, and the

Table 2. LDA topic modeling results

Topic number	Topic label	Top 10 Keywords
1	Fintech	Services, Consumers, Fees, Fintech, Naver, Online, Mobile, Operators, Systems, Commerce
2	Online education	System, Digital, Smart, Online, Artificial Intelligence, Project, Ministry of Education, Service, Global, University
3	Local media	Media, Naver, News Media, Used Car, Democracy, Committee, Online, User, Internet, Macro
4	Local Online Platform	Kakao, Naver, Kakao Talk, Kim Bum-soo, Mobility, Subsidiary, Workers, Platforms, Games, Users
6	Automobiles	Automobiles, electric vehicles, Hyundai Motor, Semiconductors, Batteries, Samsung Electronics, Global, eco-friendly, Kia Motors, Vice Chairman
7	Naver & Fair Trade Commission	Naver, Fair Trade Commission, Founder, Fair Trade Commission, Chairman, Affiliates, Trade Act, Same Person, Lee Hae-jin, Unfair Trade Commission
8	Online shopping	Online, Consumer, Shopping Mall, Department Store, Convenience Store, E-Mart, Brand, Offline, Official, Seoul.
9	COVID-19 & Medical system	COVID-19, Virus, Online, Infectious Disease, Digital, Post, Treatment, Masks, Experts, Medical staff
13	Bitcoin	Bitcoin, Exchange, Blockchain, Investor, Digital, DFY, Central Bank, Project, Service
14	Local politics	President, Democratic Party, Moon Jae In, Chairperson, the Blue House, Committee, Republic of Korea, Olympics, Representative of a Party, Park Geun Hye
15	Vietnam	Service, Global, Mobile, Soft, Competitive, Business, Vietnam, Southeast Asia, Content, Related Parties
17	OTT	Business operators, Amendments, Netflix, Korea, YouTube, Services, Internet, Global, Telecommunications Companies, Committees
19	China & Startup	Startup, Alibaba, Tencent, Unicorn, Founder, Global, Indonesia, Singapore, Internet, Asia.
23	Environment	Energy, Fine Dust, Eco-friendly, Private Education, Gas Station, Solar Power, Parents, Greenhouse Gas, Nuclear Power, Online.
24	American Media	Trump, President, Facebook, Twitter, Media, Biden, Travel Agency, Russia, Online, Donald
25	Kakao Bank	Internet, Kakao, Committee, Major Shareholders, Guidelines, Officials, Capital, Researchers, Amendment, First Half of the Year
27	TADA & Mobility	Services, Mobility, Automobiles, Startups, Rental Cars, Kakao, Business Operators, officials, Ministry of Land, Infrastructure and Transport, Amendments
28	Online community	YouTube, Internet, Website, Online, Community, Netizens, Programs, Real-time, Video, Officials
33	Adolescents	Digital, Youth, Online, Item, Victim, User, Committee, Website, Sex Crime, Pornography
34	Global Big Tech Company	Facebook, Amazon, Commission, Consumer, Store, Antitrust, Fee, Global, Report, Service
35	COVID-19 & Working conditions	COVID-19, Self-employed, Virus, Infectious Disease, Online, Difficulty, Association, Telecommuting, Subsidies, Voice

Table 3. Main themes based on topic

Themes number	Themes label	Topic labels
1	COVID-19	COVID-19 & Medical system / COVID-19 & Working conditions
2	Politics	Local politics / China & Startup / Vietnam
3	Naver & Kakao	Naver & Fair Trade Commission / Kakao Bank / Local Online Platform
4	Global Big Tech	OTT / Global Big Tech Company
5	News & Online Community	Online education / Local media / American Media / Online community
6	Technology & Innovation	Automobiles / Fintech / Online shopping / Online education / Bitcoin
7	Social problems	Environment / Adolescents

policies that have responded to it."

The second theme is the topics related to policy. Politics (Topic 14) has been on a downward trend since its surge in 2018 yet is consistently at the top. If we look at the titles of the randomly filtered articles, we can see that the president's name is often mentioned in the policies. The article titles are: "Ex-President Park is displeased with 'Choinomics'... Orders to call it 'Geun-hyonomics'," "President Moon 'The government will actively support young entrepreneurs'," "Rather, the opposition party made President Moon praised... for passing the ACT ON SPECIAL CASES CONCERNING ESTABLISHMENT AND OPERATION OF INTERNET-ONLY BANKS." International political trends also play an important role in Korean online platforms and startups, and their influence can be seen in China & startups (Topic 19), and Vietnam (Topic 15). The top 10 keywords for China & Startup (Topic 19) are "Startup," "Alibaba," "Tencent," "Unicorn," "Founder," "Global," "Indonesia," "Singapore," "Internet," and "Asia." The titles of the articles randomly selected are as follows: "What happened when the Chinese Communist Party got involved... Chinese companies disappeared from the top 10 in the world market cap," "Exceeding Samsung Electronics... The largest listing of Ma Yun's Ant Group in front of us," "The listing on the New York Stock Exchange is a crime... DiDiChuXing stock price plummeted."

The third main theme was defined as "Naver and Kakao," which are the big platforms of Korea. Naver and Kakao are platforms used by 88% of the Korean

population and account for a large proportion of a number of topics. First, the top 10 keywords for Online platform (Topic 4) are "Kakao," "Naver," "Kakao Talk," "Kim Beom-soo," "Mobility," "Subsidiaries," "Workers," "Platforms," "Games," and "Users." This topic is growing steadily, particularly in 2020. A randomly selected article concerned the problem of commissions that constantly appear on online platforms: "Commission income is not subject to capital ratio regulation, unlike loan income. In order to increase profits by making a lot of loans, there is a burden of increasing the amount of capital, but commission income can be increased indefinitely as long as there is platform power.²⁾" Other article titles are as follows: "Korean AI companies are not envious of 'data-rich' China companies," "[Korean Silicon Valley, Pangyo] Prominent IT representatives, it turns out that they are from '2N', " and "[FACTPL] 'Summer shorts ban', 'Evaluated by level', The reason 'Tada' became an employer." Second, Naver and the Fair Trade Commission (Topic 7) addresses the constant struggle between Naver and the Fair Trade Commission. The following are excerpts from related articles: "Hae-jin lee, Naver Global Investment Officer (GIO), said that Naver is not a large company by global standards, although it has more than \$5 billion dollars in assets. It should not be viewed as immoral as the company continues to grow. The Korean government tends to regulate large companies as greedy and wealthy."

2) Is Kakao Bank still innovative? Questions in the 'Ransom Bubble' Controversy, Joongang ilbo, 2021.01.25. <https://www.joongang.co.kr/article/23930421#home>

This means that the social responsibility of online platforms should not be set excessively. The titles of other extracted articles that deal with attempts to regulate Naver, which has dominant as an online platform are: "Naver shopping and Naver real estate services exposure first... Fair Trade Commission imposes sanctions on Naver bossing around," "Expansion of Naver... Is it okay because it's a brokerage business?" and "the Naver world... Sales exceeded \$4 billion and operating profit exceeded \$1 billion dollars."

The fourth theme "Global big tech company" consists of two topics: over-the-top (OTT (Topic 17)) and Global big tech company (Topic 34). The top 10 keywords for OTT topics were "operator," "amendment," "Netflix," "Korea," "YouTube," "service," "Internet," "global," "telecommunication company," and "committee." The titles of articles assigned to the topics are as follows: "Global OTT dinosaurs are flocking, but regulations are applied to domestic companies," "K-OTT, will it beat Netflix if they unite?" and "Will the native OTT gain allies? The government says 'this year is the right time for growth.'." These articles support the argument that, by regulating domestic online platforms, domestic companies may lose their competitiveness in the global market and that it is also against equity. The top 10 keywords for global big tech companies are "Facebook," "Amazon," "Committee," "Consumer," "Store," "Antitrust," "Fee," "Global," "Report," and "Service." Article titles used for topic labeling are: "Apple, unclear concessions," "When the National Assembly launched a 'Google task force', Google launched a 'half-price policy'," and "Is Facebook, an SNS empire with \$5.7 billion users, really split? The biggest crisis in 16 years." This topic shows that there is a global movement to regulate online platforms in Korea. Some of the contents of the third article implied this more precisely: "Facebook's acquisition of 'Instagram' and 'WhatsApp' was a godsend. However, the division litigation against Facebook has lit a red light on the M&A growth strategy of tech companies." In other words, the United States, which was tolerant of mergers and acquisitions

by tech companies, began to contain them.

The fifth main theme is "News and Online Community". A part of the article corresponding to the local media (Topic 3) was extracted, and it shows a cross-section that serves as a forum for exchanging opinions among the functions of online platforms such as the social media that are outside the scope of the Online Platform Intermediary Transactions Fairness Bill: The rise of far-right political forces and nativism flourished. 'Strongman politics' emerged and migrant hatred, racism, and misogyny are rampant. In addition, single-person new media such as Facebook and YouTube are spreading anti-establishment far-right or far-left populism and undermining democratic institutions and cultures. "American Media" (Topic 24) is derived from an article on social media regulation in the United States. Some of the randomly extracted articles are as follows: Republican lawmakers took issue with social media companies censoring conservative views through content regulation due to their political bias. On the other hand, Democratic lawmakers pointed out that more restrictions on platforms such as election-related fake news, hate crimes, and white supremacy are needed. The top 10 keywords of "Online Community" (Topic 28) are "YouTube," "Internet," "site," "online," "community," "netizens," "program," "real-time," "video," and "related parties." One of the articles on the topic concerns the extreme opinion of the online community about the death of a medical student, Jung-min Son.

Online platforms are created using new technologies, boldly challenge innovation, and provide new services. This theme includes technologies related to online platforms and various examples of innovation. The first topic was automobiles (Topic 27). This topic soared in 2019, when Jae-wook Park, CEO of VCNC, operator of Tada, and Jae-woong Lee, CEO of Socar, parent company of VCNC, were indicted on charges of violating the Passenger Transport Service Act. Articles corresponding to this topic include "Pandora's box that Tada is declared innocent open ... Car rental agencies are coming," "Even if Tada is banned, services like Tada continue," "Switching to electric scooters when a carpool is banned... Hyundai Motor

Company is turning to shared mobility," and "sharing electric scooters evolving into public transportation." Some excerpts from the randomly selected articles are as follows: "While the Korean government blocked the growth of car sharing platform such as Tada and Callbus with regulations and put their hands on the maintenance of the autonomous driving system, Hyundai motor company found investment targets from overseas such as the U.S., Israel, China, and India." Next, Fintech (Topic 1) consists of various contents such as Naver Pay³⁾, Kakao Pay⁴⁾, and Open Banking⁵⁾. In Korea, after the popularity of Kakao Bank⁶⁾ exploded, various companies adopted fintech. The results of randomly extracting the titles of articles assigned to this topic are as follows: "Credit transaction up to \$300 dollars is accepted through Naver Pay... Financial service commission designated this as an innovative financial service," "Just in front of the listing, Kakao Pay slammed... Red signal for the success of IPO subscription," "There is no reduction in commission income... The largest car installment profit ever for a credit card company," and "Transfer fee is free... 'Open banking' is convenient." Bitcoin (Topic 13), another innovative technology, peaked in 2018, declined in 2019, and rose again after 2020. Although it is not subject to the regulation of online platforms, it is mainly related to online transactions; therefore, attention should be paid to this topic. Randomly selected article titles are as follows: "China blocks access to cryptocurrency trading service platform," "the investor's eyes focused on Biden's words... perturbed coin investors," and "Block Stack submits a legal opinion to the SEC that it is not classified as securities... The keyword is 'decentralized'."

3) Naver Pay: A payment method widely used in Korea, such as Apple Pay in the US

4) Kakao Pay: It is a payment method such as Naver Pay, and it is in the top two in Korea along with Naver Pay

5) Open Banking (Service): A service in which other financial institutions or fintech services can inquire about customer financial information or transfer accounts on behalf of a certain financial institution

6) Kakao Bank: Online bank such as Ally Bank in the US

V. Discussion

Twenty-one topics related to online platform regulation were grouped into seven themes, and the meaning of each theme was examined. Some topics are directly related to the regulation of online platforms, while others are outside the scope of online platforms targeted by the Online Platform Intermediary Transaction Fairness Bill. Although they are not directly related, they are meaningful in that they examine online platform regulation from various perspectives.

First, the topic modeling results of COVID-19 (Theme 1) show that the pandemic has brought about many changes around the world (Hoyles, 2021), in particular, it has accelerated digitalization and strengthened the regulation of online platforms. In addition, the number of keywords corresponding to this theme increased at a specific point in the study period, and the keywords constituting the theme diversified. This shows that topic modeling does well to not only capture changes over time but also to divide the same topic according to characteristics.

Second, politics (Theme 2) indicates that politics play an important role in the growth of online platforms. In Korea, contents related to startups and online platforms are highlighted, with the president as the center. In China and Vietnam, the government's regulatory direction has a direct impact on the growth of online platforms. Moreover, this indicates that international politics have a significant influence on Korean online platforms because China and Vietnam are important markets for Korean platform companies. For example, as the Vietnamese government actively supports startups, the economic value of its market has increased. This means that it is easy to enter the market because Vietnam's startup regulations are not high. Online platform regulation can hinder the growth potential of the market, and excessive regulation can prevent the growth of online platforms as well as entry into overseas markets. In a global landscape where America's Big Tech dominates every region except China, the South Korean economy,

possessing platforms capable of competing with American Big Tech, must find a delicate balance between fostering and regulating these platforms. Therefore, when formulating platform regulation policies, it is crucial to consider both domestic and foreign companies simultaneously to avoid potential reverse discrimination against domestic firms. From a regulatory perspective, preventing reverse discrimination against domestic companies means not applying regulations to them that would realistically be difficult to enforce on foreign firms. If regulations are applied exclusively to domestic companies, this could increase their compliance costs and lead to a weakening of their global competitiveness (Choi & Si, 2021).

Third, Naver and Kakao (Theme 3) are directly related to online platform regulations. There is criticism that this regulation is aimed at Naver and Kakao, and, as if supporting this, a significant amount of news big data was extracted from these two platforms. Various topics related to online platforms, such as the power struggle between Naver and the Fair Trade Commission, the issue of fees, Naver Bossing, and the problems inherent in online platforms are being addressed (Choi & Si, 2021; Kim et al., 2022). While discussions on regulating platform giants in the United States and the European Union are centered around antitrust laws, in South Korea, the debate begins with and focuses on the abusive practices of platform giants and the encroachment on traditional market territories (Kim et al., 2022). What can be seen from this theme is that Naver and Kakao are at the center of discussions on Korean online platforms. Naver and Kakao are central to discussions on domestic online platforms, as they appear steadily in other topics as well as in this theme.

Fourth, global big technology (Theme 4) and news and online communities (theme 5) can be grouped as "online media platforms." These themes show that online platforms not only serve as a news gatekeeper but also as a forum for the exchange of opinions beyond their economic value. Moreover, as they also provide cultural content, even though the current

Korean Online Platform Law targets unfair practices in economic transactions, it reveals the need for in-depth discussions on online media platforms in the future (Kim et al., 2022).

Finally, technology and innovation (Theme 6) show that online platforms become the driving force behind innovation as technology advances. This is because the theme includes topics that encompass innovation and new technologies. It includes topics related to innovation to create new technologies, such as Fintech (topic 1), Bitcoin (topic 13), and TADA & Mobility (topic 27), and topics that innovate existing services or products, such as online education (topic 2), automobiles (topic 6), and online shopping (topic 8). Reflecting the current market environment where domestic platform companies' technological innovations prompt the digital transformation of traditional businesses (Choi & Si, 2021), it is deemed reasonable to relax regulations considering technological innovation.

VI. Conclusion

As the United States, which was passive in regulating online platforms, participated in the international efforts to regulate large online platforms, it became inevitable for Korea to join the flow of regulation. To explore the discussions over the past five years regarding online platforms, this study analyzed JoongAng Ilbo articles from January 1, 2017, to November 10, 2021, categorizing them into seven themes. Overall, Naver and Kakao are central to online platform regulation, and online media platforms that are not directly regulated by the Online Platform Intermediary Transaction Fairness Bill have also emerged. The Bill aims to regulate platform companies to help small business owners and prevent unfair practices in the transaction process. However, since the characteristics and functions of online platforms are much more comprehensive, the social impact that platform companies will have in the future should be closely examined. It is also necessary to systematically

classify online platforms according to the domestic situation. Competition for global hegemony in the platform industry is intensifying (Hermes et al., 2020), and balance is vital for online platform regulation for the development of a sound industry. Regulations have been delayed because of the innovativeness and economic value of online platforms; however, changes are now needed (Bakria et al., 2023). A regulation level that does not impede innovation and growth is required. Online platforms must not hinder the growth of other businesses, impose unfavorable conditions on retailers, or deprive consumers of choices in the name of innovation.

This study is significant in the following ways: Previous studies examined the Online Platform Intermediary Transactions Fairness Bill only from the perspective of policy, but this study examined the overall issues surrounding online platforms that have emerged over the past five years. Because online platforms have a wide range, diverse services, and large changes over time, this study is meaningful in that an appropriate methodology is used to capture them. However, a limitation of this study is that only one newspaper was selected. If we compare several newspapers, we can look at the various agendas related to online platforms from different perspectives. In addition, in the process of refining articles containing the keywords "online" and "platform," it is necessary to make up for the fact that noise occurred in the data as articles unrelated to online platforms, such as "Online JoongAng Ilbo," were collected.

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