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A STUDY ON SOCIAL PROBLEM ISSUES THROUGH BIG DATA ANALYSIS

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Abstract. *This paper seeks to analyze social problem types and major issues through the analysis of big data in a bid to derive today's social problem issues. Towards this end, this study uses text mining techniques and the R program to extract social issue keywords from online sources, analyze them, and examine solutions in conjunction with previous studies.*
Keywords: Big data, Social problem, Text mining

1. **Introduction.** The South Korean society is suffering from social problems such as the loss of growth engines, low births, the advent of aging population, economic and social polarization, and the lack of jobs. Porter emphasized that with regard to these social imbalance problems, social needs and problems should be sufficiently considered in order to create the shared values that can create not only social values but also economic values [1]. Also, Kotler et al. reported that corporations conduct activities to resolve social problems, and that consumers, based on the information technologies available, actively participate in the formation of markets [2]. This implies that the resolution of social problems is no longer only the government's role but requires the engagement by corporations and citizens. Scholars report through research that scientific technologies play an important role in tackling such social issues [3]. Out of the government's recent R&D budget, the ratio of the non-oriented research cost is increasing, supporting such scholars' insistence [3]. Also, Lee reported in his research that the utilization of big data can predict the future prospects and provide solutions to such social issues [3]. In the paper, we analyzed big data on our current social issues in a bid to determine the types of diverse social problems and major issues. Ongoing social problems are also derived from the big data analysis.

2. **Classification of Social Problem Issues through Analysis of Previous Studies.** Social problem issues can be classified according to researchers' individual reference criteria as well as to the causes, attributes and types of social problem issues. Social problem issue types can be classified from both the academic viewpoint and from the perspective of using them in the government's policy formulation. With these two viewpoints in mind, this study arranged the contents of academic viewpoints of previous studies.

Researchers saw the society's structural problems and corresponding mental agonies as the major social problems, and defined and analyzed the corresponding detailed problems.

3. **Definition of Big Data and Performance.** Big data usually includes data sets with sizes beyond the ability of commonly used software tools to capture, curate, manage, and process data within a tolerable elapsed time [11]. As such, the widely used big data refers to informatization technology designed to use and analyze the huge data, to extract

Table 1. Expected problem solution using big data

Problems	No. of responses
Current problems and solutions	18
Prediction of future prospects and solutions	29
Identification of user needs	13
Achieving economic efficiency	8
Enhancement of administrative transparency	8
Realization of intelligent-type administrative services using ICT	18
Scientific decision making based on data	26

(Source: Lee, 2013)

valuable information from such analysis, and to predict changes and proactively tackle such changes. Various researchers have reported that the utilization of big data allows corporations to expect high business performance through managerial efficiency and to secure their own unique competitiveness. The values obtained through the use of big data are presented in Table 3.

This study proved that the decision making based on the use of big data through studies as shown in Table 3 can enhance the corporate operation efficiency, ensure cost reduction, and remove risk factors, allowing the corporation to secure its unique competitiveness.

4. **Determining Social Issues through Big Data.** Nowadays, our society's research methods are designed to use big data techniques and explore the hidden values in the data, so as to formulate useful policies in diverse areas and cope with accidents. The recent Big-FI project, launched in Gyeonggi-do, South Korea, aims to derive necessary first-priority services, aiming to explore fresh ideas for providing good-quality services to citizens. According to some studies, New York City in the U.S. gathered diverse information through its real-time crime watch system DAS, analyzed it, and subsequently reduced crime risk factors. To derive diverse and unique values, valuable information necessary for users should be searched and analyzed from big data, and these efforts further boost the value of the strategies implemented for problem solving [15]. In particular, the use of big data in the public sector will create high values for society as well. In other words, if current diverse social problems and major issues are analyzed through big data analysis, then solutions to such problems can be found, and it can prevent large-scale accidents.

5. **Data Mining.** To survey South Korea's social issues, this study used the country's key search engine NAVER's Knowledge Page, entered the keyword social problem in the portal, and searched for results. NAVER is South Korea's largest search engine portal with a market share of over 80%. NAVER's Knowledge Page allows a large number of Internet users to naturally ask questions and answer them. In this study, the five years' worth of searched data in NAVER's Knowledge Page from 2010 to 2015 were gathered using the text mining technique, and the surveyed non-standard data were analyzed using the R program. Of the five years of gathered data, data irrelevant to social problems were excluded, and only related words were re-extracted, and presented in wordcloud as in Figure 1.

In this study, to derive social issues, only noun words were extracted from the five years of non-standard data. Then out of the extracted data, 2,590 keywords were extracted and researched. Only social issue-related words were extracted. Frequency analysis of the derived data was conducted. Lastly, to help the data analysis, the results were visualized in wordcloud. According to the analysis of the big data surveyed herein, Koreans thought of population aging and elderly problems as big social issues. Also, preparations for the

Table 2. Scholars' viewpoints on social problem issues

Researcher	Classification	Detail
Schneider et al. [4]	Tragic social problems	Mental disorder, suicide, alcohol addiction, etc.
	Negative social problems	Race discrimination, poor class, sexual discrimination, etc.
	Threatening social problems	Crime, population, smoking, drug addiction, etc.
	Molested social problems	Mass murder, mass suicide, child abuse, war, etc.
	Social overbearing	Abortion, euthanasia, etc.
	Social defects	Bureaucracy, immorality, etc.
Kim [5]	Structural problems	Poverty, income distribution, labor, education, inequality, etc.
	Destructive problems	Family breakup, slum, population, environment, etc.
	Deviation problems	Crime, juvenile misconduct, prostitution, suicide, alcohol abuse, mental disease, etc.
Ko [6]	Socio-structural problems	Urban problem, labor and management problem, poverty problem, crime problem, etc.
	Family and generation problems	Family problem, women's problem, youth problem, senior citizen problem, etc.
	Quality of life problems	Environmental problem, population problem, health and medical service problem, leisure problem, etc.
	Korea's unique problems	Graft and corruption, regionalism and region, academic background system, and academic ability
Choi & Choi [7]	Social change or dissolution	Family, environment, senior citizens, etc.
	Social inequality	Poverty, sexual discrimination, labor and management, etc.
	Social deviation	Juvenile misconduct, crime, sexual violence, drug addiction, mental health, etc.
Merton & Nisbet [8]	Social dissolution	Population, race, family breakup, labor and automation, poverty, local society dissolution and conflict, violence, etc.
	Dissolution activity	Mental disorder, crime, juvenile misconduct, drug addiction, alcohol addiction, suicide, sex problem, etc.
Parrillo et al. [9]	Personal welfare threats	Alcohol, drug abuse, sex, crime, violence, terrorism, etc.
	Social equality threats	Population, poverty, exploitation, sexual discrimination, etc.
	Social system threats	Family, education, labor, employment, health care, etc.
	Life quality threats	City, farming villages, population, environment, etc.
Eitzen & Zinn [10]	System problems	Wealth and power, social system, wealth concentration, collusion between politics and business, power concentration, etc.
	Population problems	Globalization, environment, aging, city, food, etc.
	Inequality problems	Poverty, race, sexual discrimination, homosexuality, etc.
	Policy problems	Labor, employment, family, abuse, education, health care, terrorism, etc.
	Deviation problems	Mind, crime, drugs, maladjustment, etc.

elderly economic life, including national pensions, were presented as major social issues. In other words, Koreans were much concerned about the country's aging population and elderly economic life problems. They also showed interest in the gap in wealth, social reform, and schools' student free meal provision system, among other social systems and welfare systems. This analysis revealed that a large number of Koreans take interest in social welfare systems, and subsequently, in social systems reform.

TABLE 3. Values obtained through the use of big data

Research institutes	Economic effects
LaValle et al. [12]	If an organization uses analysis of data more efficiently, it will secure more unique competitiveness and create higher performance.
Manyika et al. [13]	Data is the 21st century's crude oil and determines a business' future competitiveness. As such, corporations should understand the upcoming data economy era, and should be warned over being isolated from information.
SAS [14]	More accurate analyses may lead to more confident decision making. Better decisions can mean greater operational efficiencies, cost reductions and reduced risk.

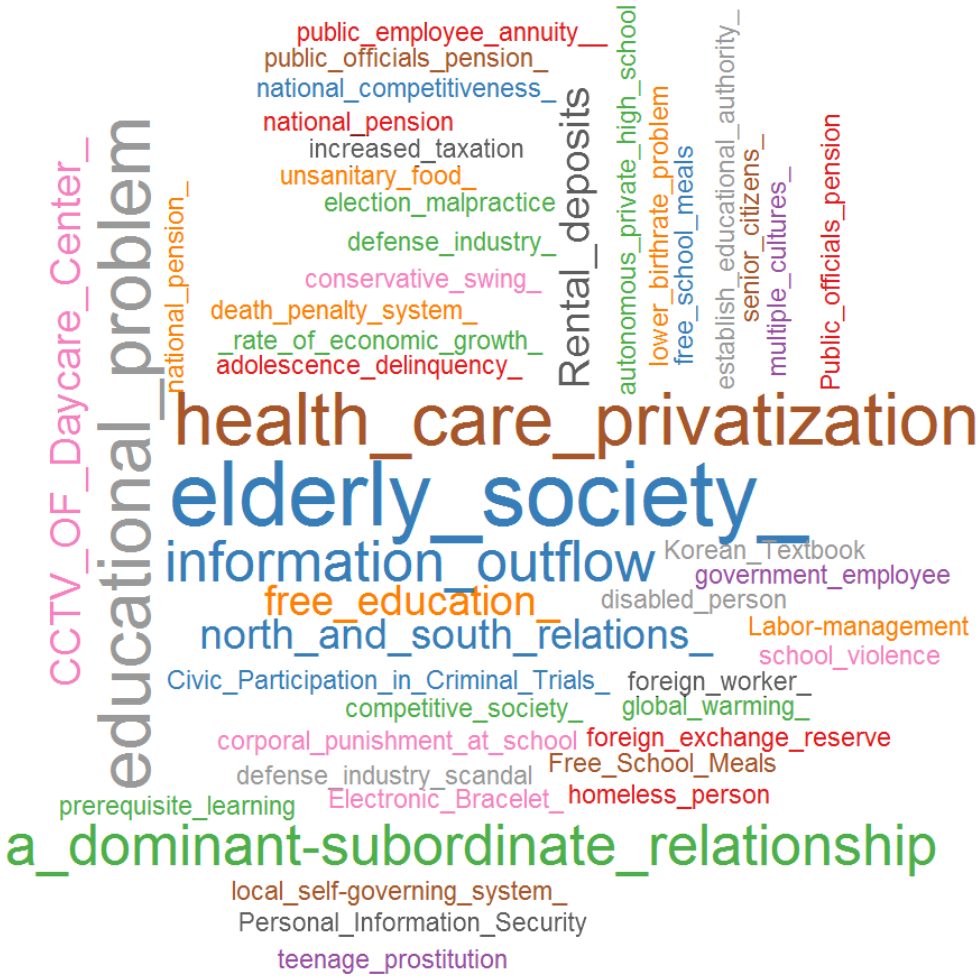

FIGURE 1. Deriving social issues through Internet search

6. **Limitations and Future Research.** This study gathered diverse social issues from the Internet and analyzed them. The Internet presents a variety of huge data. However, to extract such data and process them into meaningful information, statistical techniques are needed. It is difficult to gather such big data, and it is also very difficult to standardize such data to analyze them. Thus, if non-standard big data are gathered and analyzed, the value of the data will be greatly enhanced. This study shed the limits of existing meta research techniques, used in previous studies, and derived social issues based on actual data. However, to ensure a more meaningful analysis of big data, a wider variety of the target data should be gathered. Thus, to further this research, there is a need to gather diverse data, to analyze them in diverse ways, and to upgrade the value of data analysis.

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