

R프로그래밍을 활용한 공유경제의 한국인 집단지성: 텍스트 마이닝 및 시계열 분석[☆]

Korean Collective Intelligence in Sharing Economy Using R Programming: A Text Mining and Time Series Analysis Approach

김재원¹ 윤유동² 정유진³ 김기연^{4*}
Jae Won Kim You Dong Yun Yu Jin Jung Ki Youn Kim

요약

본 연구의 목적은 최근 창조경제 또는 사회적 경제 관점에서 주목받고 있는 공유경제라는 키워드에 관해 현대 한국인들이 가지고 있는 대중적인 문화 및 사회적 인식, 즉 집단지성의 변화 추세를 조사하는 것이다. 이를 위해, 본 연구는 빅데이터 분석 관점의 텍스트 마이닝 기법을 적용하여 최근 5년 간 사회·문화적 집단지성의 객관적이고 가시적인 연간 변화 및 패턴들을 발견하고 이해하고자 한다. 월드 와이드 웹에서 크롤링(crawling) 기법과 구글링(googleing)을 통해 분석에 필요한 2010년부터 2014년까지 축적된 상당한 양의 공유경제를 주제로 한 기존 문헌들의 시계열 웹 메타 데이터를 수집하였다. 결과적으로, 많은 양의 가공되지 않은 공유경제 키워드 관련 원 자료들은 R프로그래밍 분석을 통해 보다 의미 있는 가치 있는 '워드 클라우딩' 형태의 그래프나 그림으로 분석처리 되었다. 아직까지 시기적으로 공유경제에 관해 축적된 자료나 집단지성이 양적으로 미비함에도 불구하고, 본 연구는 지식처리 관점에서 시계열 빅데이터 분석을 수행한 선행연구라는 점에서 의미가 있다. 따라서 본 연구의 결과는 향후 산학 분야에서 공유경제 관련 시장분석과 소비자 행동학 관련 후속 연구들을 위해 1차 자료로서 학문적 시사점을 제공할 수 있다.

☞ 주제어 : 공유경제, 집단지성, 텍스트마이닝, 빅데이터, R프로그래밍, 시계열분석

ABSTRACT

The purpose of this research is to investigate Korean popular attitudes and social perceptions of 'sharing economy' terminology at the current moment from a creative or socio-economic point of view. In Korea, this study discovers and interprets the objective and tangible annual changes and patterns of sociocultural collective intelligence that have taken place over the last five years by applying text mining in the big data analysis approach. By crawling and Googling, this study collected a significant amount of time series web meta-data with regard to the theme of the sharing economy on the world wide web from 2010 to 2014. Consequently, huge amounts of raw data concerning sharing economy are processed into the value-added meaningful 'word clouding' form of graphs or figures by using the function of word clouding with R programming. Till now, the lack of accumulated data or collective intelligence about sharing economy notwithstanding, it is worth nothing that this study carried out preliminary research on conducting a time-series big data analysis from the perspective of knowledge management and processing. Thus, the results of this study can be utilized as fundamental data to help understand the academic and industrial aspects of future sharing economy-related markets or consumer behavior.

☞ keyword : Sharing Economy, Collective Intelligence, Text Mining, Big data, R-programming, Time Series Analysis

1. Introduction

After the financial crisis in 2008, the future of capitalism has been the main topic of discussion in international society [1]. The competition-oriented and result-oriented capitalism of the past has changed to a new capitalism emphasizing

¹ Graduate School of Information, Yonsei University, Seoul, 120-749, Korea.

² Dept. of Computer Science and Engineering, College of Informatics, Korea University, Seoul, 136-701, Korea.

³ Dept. of Multimedia Science, Sookmyung Women's University, Seoul, 140-742, Korea.

⁴ Dept. of Marketing Information Consulting, Mokwon University, Daejeon, 302-729, Korea.

* Corresponding author (gracekykim@mokwon.ac.kr)

[Received 3 July 2016, Reviewed 14 July 2016, Accepted 10 September 2016]

☆ This work was supported by the National Research Foundation of Korea Grant funded by the Korean Government (NRF-2014S1A5A8016275)

symbiosis and cooperation, and these phenomena have allowed shared value or cooperative sharing economy system based on social networks to appear [2]. The term of "sharing economy" was first used by Lawrence Lessig of Harvard Law School in 2008. This means cooperative consumption in which goods, once produced, are shared by many people matter of as a principle [3, 4]. It is motivated by an economic concept called 'The tragedy of the commons' [5]. Sharing economic services already existed in the past, but it was not active due to difficulties of sharing information between members of society and to a consumption-oriented and economic system based on private possession. But today, dealings in and purchases of goods in global network has developed in term of the strength of the network and IT platforms. The spread of SNS has promoted sharing information between individuals and information-oriented new business models based on diversified information.

The sharing economy in Korea was adopted in early 2012, and recent successful cases of international sharing economic services have been benchmarked and developed as localized domestic business models.

The purpose of this study is to explore trends and patterns of related terms and keywords of the sharing economy by year through the text mining method from a big data analytical perspective. With regard to the topic of the sharing economy, the word cloud of related words showed social consumers' awareness of this new idea in depth. The concretely text data and information related to sharing economy pertains to sharing economy issues, sharing economy news from a social perspective, web data dealing with consumers' thoughts, etc. Recently serious changes in Korean sharing economy have discovered changes in; Korean collective intelligence and social concerns. The results of the study can offer suggestions with respect to sharing economy activation policies or business model strategies.

2. Theoretical Background

2.1 Proceeding Researches of Sharing Economy

Sharing economy is cooperative consumption sharing and exchanging goods in a mode that happens between not only

businesses and consumers but also between consumers and other consumers based on information and communication technology infrastructure. This cooperative consumption needs an open mind toward the idea of consumption. Performers of consumption are not greedy when they can use goods that they need, and they can give or share their goods to others when others need them [1]. The broad concept of sharing economy can be understood in the context of Creating Shared Value (CSV). Professor Michael Porter defined Creating Shared Value as a business and investment activity by which companies can achieve strengthening their long-term competitiveness and serve an environmental purpose at the same time [6]. A case study defined Creating Shared Value more accurately in the case analysis of American and Japanese companies' business establishment in rising nations. Similarly, shared value focused on social development and expanding the income of a community, which in turn reinforces business competitiveness.

Meanwhile, corporate social responsibilities have recently become a topic of conversation, in which the value of sharing economic services as related to cooperate social responsibilities is increasingly appreciated. Corporate social responsibility (hereafter CSR) follows the market evolution. Kotler (2010) explained that market 1.0 has changed to market 3.0. Now that we are in the market 3.0 era, the value of 'joining' the sharing economy with companies that are actively involved both in market environments and social problems to increase consumer participations has been realized and emphasized [6].

Looking at prior research studies on the sharing economy and Creating Shared Value, the concept of the sharing economy, internal and external industrial trends, the business model of the sharing economy, consumers awareness, policy studies, etc. have become mainstream and are spreading. Spreading social awareness of the sharing economy and of diverse types of sharing economic services has generated more academic concrete case studies of business or service models of the sharing economy. Kim (2014) shows types of consumers' participation and stakeholders' role changes due to convergence of many consumerism and creating shared value, and it suggested a successful case of creating sharing value holding up an example of AirBnB which is a representative model of sharing economy [10]. Hwang(2014) investigated internal and external case of car-sharing, trial effects and operating system at this stage, and analyzed that

car-sharing service of sharing economic have changed of decrease of riding distance and type of possessing cars [11]. Recent research suggested activation plans for sharing economy to harmonize game tools with non-game contents as a catalyst of spreading sharing economy. Maeng (2014) suggested elements of catalyst of sharing economy studying relationship between sharing economy and game elements such as gamification badges and compensation [12]. Lee (2014) adopted Business Model Canvas (BMS) and tried to connect Smart Week Center and sharing economy [13].

There are studies about sharing economy in the view of policy continuously. As one of policies for governmental creative economy, small business start-up or fostering policies are carried out to activate sharing economy macroscopically [14]. Jo (2012) research suggested a collaboration model between small businesses in sharing economy, and studied proper business scale, selection of target companies and distribution methods for profits. Sharing economy businesses are implementing at the level of local autonomous entities following current governmental policies. Kwack (2013) is a case of Seoul City that explains sharing economy as the concept of sharing city at the level of local communities and cities [15]. There are consumer studies of proceeding research from a different angle. Choi (2013) studied the effects on sharing economy building a capital for digital culture with survey in the view of consumer behavior. It proved that consumers' internet and SNS participation and information utilization ability can affect directly to consumers' sharing intention and behaviors [4]. Kim(2013) suggested a theoretical definition about segmentation of sharing economic consumers with study of consumers' awareness and subjectivity according to a sharing economic service model by qualitative analysis in the view of marketing communication [5].

There is a study to apply sharing economy to social companies. Kang(2012) gave escape from the economic crisis of Capitalism, plans to activate regional economy, sustainability and implications for policies, applying sharing economy to social companies [1]. More studies about sharing economy and more interests on sharing economy, but there is little study that how sharing economy has changed from the past. There's a necessity to study that Korean sharing economy have what kinds of demands of society and consumer in the future.

2.2 Sharing Economy and Collective Intelligence

The concept of 'sharing' is not easy economic system to apply in this society based on Capitalism which private property is essential. Private property management about products, services and contests is guaranteed under digital economy based on internet environment. The concept of sharing in this environment is contrary to the value of existing paradigm and difficult from theoretical argument to application in reality now. There is also an opinion that the sharing economy emerging is the temporary in economic depression though desires to possess things never disappear [13].

But spread of state-of-the-art Smart Technology and social media fuelled cooperative consumption culture of sharing economy and potentials of creating new values. Whether developers intended or not in development, consequentially social media have more meaning than a device simply connecting people in convenience. Lateral, diffuse and sharing communication ecosystem has been born [4].

Rifkin(2001) asserted the era that rental or sharing methods are becoming more popular than possessing goods and knowledge [16]. Latest real public interest in sharing economy based on internet has increased. Smart phone penetration rate in Korea is 88.7% (in 2014), ubiquitous convergence environment where anyone can access the internet with wire - wireless sensor network has come closely [17]. These internet effects can make people gather together easily in on-offline communities or social network. SNS technology development like Facebook and Twitter takes on a role of open-platform to share information, resources and districts in the occasion of needs in real time with the global overcoming geographical boundaries. In addition, now various consumers in social network are leading economic activities. Mutual business dealing, re-use, -rental and sharing culture is developing [18]. Thus in existing consuming culture, sharing economy can be explained that new economic paradigm using resources efficiently in the aspect of social welfare.

The concept of Collective Intelligence was first introduced with the birth of Web 2.0 technologies and is being used in many areas [18]. Collective Intelligence means intelligence from group of people, and problem-solving abilities of group based on information and knowledge sharing of various

individuals. Levy, P. defined Collective Intelligence as intelligence that is everywhere, continuously value-added, adjusted in real time and mobilized with actual capability [20]. Russell(1995) defined Collective Intelligence as intelligence that many individuals who have their own thoughts make from 'cooperation'. In other words, Collective Intelligence is defined as a value from cooperation with others that ability from one's own. Park et al. (2007) referred Collective Intelligence as the "wisdom of crowds" and the "swarm intelligence," while arguing that the knowledge sprung from interactions within a certain group is better than that generated by an individual [21].

Wikipedia, an online encyclopedia service run by voluntary participants around the world, is one of the most well-known examples showing an effective use of Collective Intelligence. Other online databases based on utilizing Collective Intelligence have proven to be beneficial to their users and also demonstrate that sharing of information and resources can more efficiently run the current society than strictly following capitalist market practices can.

2.3 Type of Sharing Economic Services

Services related to sharing economy are estimated that there are 8,322 operating in 135 countries in the world [20]. Sharing economy is integrated in many fields in due form from tangible/intangible resources, knowledge and intellectual to digital products and services. Sharing economic Services are largely divided into 3, product services, bartering and cooperative communities.

First, sharing system related to product services is not possessing ready-made products but sharing products owned by others with reasonable rental fee. At this time, products or services to use are belonging to others. Typical examples are car-sharing, bicycle-sharing, online rental, movies and etc. These types have significances that can reduce cost of products when they possess them.

Second, sharing system related to bartering is redistributing goods and recycling products not to use by exchanging goods. People can share things they don't need to others, and they can use things they need from others. Typical examples are exchange of secondhand appliances, exchange of secondhand books, exchange of baby products or toys and exchange of

clothes. These practices of recycling reuse and redistribution can save resources and reduce economic excessive consumption.

Third, sharing system related to cooperative communities is a service of cooperative consumption in a way of community to share information with information and communication technology. It means the ways that people who have common concerns share information together, or that people share and consume together. It's a behavior that others share their own knowledge and create knowledgeable values in learning. Typical examples are talent-sharing, dinner meeting and etc. Cooperative community system is making many relationships and connections in new society following to focusing on trust and communications between people. Looking through foreign cases, there are many successful cases like company, Zipcar in U.S.

Not only B2C (Business to Consumer) mode of transaction but also P2P (Peer to Peer) or C2C (Customer to Customer) mode of transaction have spread out. These types of sharing economy make up for the weak point of existing rental service to waste products' idle time.

In the other words, it made efficient exchange of goods and operating deals by dividing service rental or sharing time by minutes, and actualized reasonable consumptions economically. Similar cases in Korea are activations of So Car or Greencar. Recently Seoul City expects 2 billion won of saving effects to replace 2.2% of all traffic with sharing transportation [11].

Sharing economic models depending on ICT technical evolution are dealing or redistributing services of secondhand articles through internet sites Such as eBay, Auction, G-market, etc. It's a redistributing system that consumers put their goods they don't use up for auction. 'The Open Closet' and 'Kiple' are examples of these bartering sharing economic services. 'The Open Closet' receives nonuse suits and rents donated suits at the lowest prices, and 'Kiple' gives value consumption services that share the value of stories in the products people donate such as baby and kids clothes, toys with short period of using [23].

Last, cooperative community services have successful models of sharing economy such as AirBnB, UBER. In the case of AirBnB, individual can use spare rooms of others connected through IT and provide rooms to travelers or people who needs accommodations in the form of guesthouse.

Through this it raises efficiency and distributes economic goods in balance. Exiting accommodation services only provide individual rooms, but this can provide various kinds of places from general apartment to solitary islands by SNS or e-commerce. Individual dealings between people can bring exchanges with native people at a low price, and give advantages to have independent spaces [22].

3. Research Design and Methods

3.1 Simple Frequency Analysis

Word-clouding analysis was executed based on frequency of related terms (related searches) when keyword of 'sharing economy' was searched from 2012 to 2014 by year. Top 10 frequent words in the result of search are in the list. In the process of ranking, searched keyword 'sharing economy' doesn't have any meaning in interpretation. Except this, rests of them were compared to each changing process divided into 3 periods from 2012 to 2014.

3.2 Text Mining and R Programming

Text mining is a method of utilizing atypical information, which occupies 80% of all data, by collectively and comprehensively analyzing various texts in order to discover the relations existing within the texts. Thus, this method can be seen as a process of generating new knowledge through exercising its executor's creativity [24]. Text mining is a process that searches for information in context, meaning which users have specific concerns in a massive body of data. Recent rapid development of information and communication technology requires fast methods that can process massive information automatically. Text mining offers a chance to find hidden patterns in massive data and becomes a method for searching a certain topic and related data [25].

Using this method, the sharing economy was searched and related data was collected. R programming language is a programming language for statistic computation and graphics that is currently popular with big data. Based on collected data, data related to the sharing economy was examined by word-cloud. Through analyzing the increase in the amount of data from year to year, this paper will examine the level of

interest in the sharing economy. It will also analyze the changes in issues from year to year by examining the top 5 key-words from 2012 to 2014.

3.3 Preconditioning Process and Pre-Test of Data

In this paper, every data about sharing economy was quoted from blog, web, article and etc to collect data with Crawling technique. After collecting data about sharing economy, preconditioning process of data was conducted focusing on words and roots with Hangul 2010 program after deleting all endings and postpositions of data. After this process, the collected data were converted into a CSV file and analyzed with R Script. The analysis employed visualizing the frequency of the key-words from the data in forms of Word-cloud.

4. Frequency Analysis

4.1 Frequency Analysis

After analyzing the frequency of key-words about the sharing economy using the methods of frequency analysis explained above, the top 10 by year were ranked below in Table 1. In 2012, 2013 and 2014, services were mentioned the most frequently. In 2012, key-words such as 'rental', 'business', 'and possession' appeared. Such key-words show the conceptual confusion between "rental" and "possession" within Korean society in 2012, when the sharing economy was first introduced in Korea. Despite this confusion, the highly frequent appearances of these key-words can also be interpreted to indicate the Korean public's heightening level of interest in the sharing economy. In 2013, key-words such as 'enterprise' and 'Seoul' appeared, and these new key-words were emphasized after the announcement of the 'Sharing City Seoul' Plan that encouraged every sharing economy model for Seoul City. In 2014, new key-words such as 'UBER', 'taxi', and 'car' appeared. UBER is a world car-sharing service company that essentially provides taxi service. But UBER had a conflict with taxi companies in a controversy between sharing economic system and illegality, so key-words such as 'UBER', 'taxi' and 'car' were mainly mentioned.



(그림 1) 2012, 2013, 2014연도별 R_Script를 이용한 워드 클라우드
 (Figure 1) R_Script 2012, 2013, 2014 Word Cloud

(Table 1) Top 10 Keyword

rank	2012	2013	2014
1	Human	Enterprise	Service
2	Service	Service	UBER
3	Internet	Start	AIRBNB
4	Consumption	Seoul	Enterprise
5	Rental	Possession	Human
6	AIRBNB	Consumption	Consumption
7	Business	AIRBNB	Use
8	Use	Business	Taxi
9	Kozaza	Use	Utilization
10	Possession	Utilization	Car

4.2 Word-Cloud Analysis by Year

Word-cloud was used as a data which can give recent issuing words at a glance with star weighting per words. In this chapter, this study will examine the word clouds appearing in Fig. 1.

In 2012, focusing on ‘service’ and ‘consumption’, definition of sharing economy such as ‘we’, ‘together’, ‘rental’ and etc were mainly discussed and American sharing economic service, Airbnb sharing economic model was mainly discussed like Fig 1. Thus an analysis of 2012 refers overall definition and features of sharing economy and mentions a representative successful case as Airbnb.

In 2013, focusing on ‘enterprise’ and ‘service’ there are

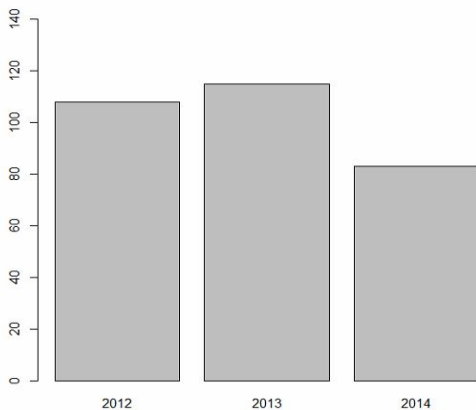
many contents such as ‘Seoul’, ‘AirBnB’, ‘value’, ‘various’ and etc like Fig 1. In early 2012, after adopting sharing economy in Korea sharing economic service models has been activated with the announcement of ‘sharing city Seoul’ in early 2013 and many services and companies of sharing economy were mentioned.

In 2014, focusing on ‘service’ and ‘UBER’ there are many contents such as ‘car’, ‘business’, ‘service’, illegal’, ‘taxi’, ‘vehicle’ and etc like Fig 1. In 2014, UBER had a constant controversy between sharing and illegality at the point of sharing normal cars like taxi. In addition, there were only advantages of sharing economy in 2012 and 2013. But to the contrary, weaknesses and double faces of sharing economy were exposed in 2014. However, still many sharing economic services and companies of sharing economy had received a lot of attention.

4.3 Data Growth Analysis by Year

This study analyzed the change in the Korean public’s level of interest in the sharing economy from 2012 to 2014 and visualized the result in the following graph. The level of interest in the sharing economy in 2012 does not appear to be low. This study argues that this result is due to the fact that the concept of the sharing economy was first introduced into Korean society in 2012. Also, the rush of various applications of the concept in the Korean market alongside of circulation of the idea must have caused a high level of

interest. In 2013, that level further increased by a small amount. While the graph shows that the level of interest decreased in 2014, considering the fact that the data from October to December 2014 were missing, this study argues that the level of interest in sharing economy was still significant in that year.



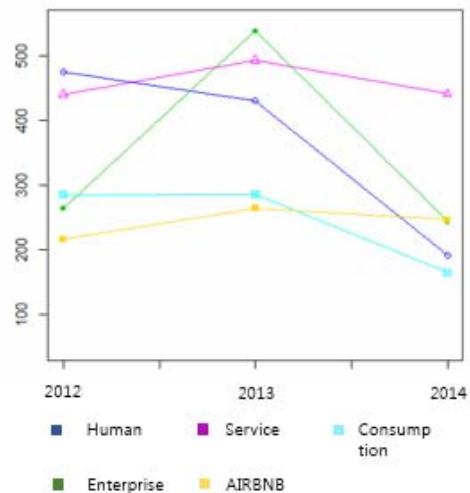
(그림 2) 연도별 데이터 증가 분석
(Figure 2) Data Growth Analysis by Year

It can be a result based on only 3 years' worth of data from 2012 to 2014, and there can still be a different result based on still more data. Considering the development speed of this sharing economy, in future research a huge amount of data can be collected in a short time, not only with respect to developments and changes in the sharing economy in this paper but also developments and changes of various sharing economies in the future.

4.4 Keyword Change Analysis by Year

The annual keyword analysis will show which key-words received the public's consistent attention, which became important issues and were then forgotten, and which made sudden appearances. As shown in Fig.3, "Human" was the most prevalent keyword in 2012, but "Enterprise" received a relatively lower amount of interest. In 2013, however, "Enterprise" rose to become the top keyword of the year. In 2014, the level of interest in "Human" decreased more rapidly; "Enterprise," the most prevalent keyword of 2013, also lost a significant amount of attention along with the decreased

attention to "Consumption." The levels of interest in the top key-words of 2012 and 2013, other than those of "Human" and "Enterprise," which fell significantly, did not fluctuate greatly. One noticeable keyword showing such a pattern is "Service." It constantly gathered a high level of interest from 2012 to 2014, and this signifies that the public paid attention to the service sectors newly sprung from the spread of the sharing economy. In the future, good sharing economy service is expected to appear then now.



(그림 3) 연도별 키워드 변화 분석
(Figure 3) Keyword Change Analysis by Year

5. Conclusions

This study is dealing with a topic of sharing economy which was introduced recently in Korea collecting and analyzing data. Still it's an unfamiliar economic system and word-clouds of 2012, 2013 and 2014 show little changes on the whole. And most of them are benchmarking cases of foreign successful business models and related contents.

But there are big potentials to grow constantly with good infrastructures to promote rapid growth through similar economic system such as Anabada (exchanging market of secondhand goods), exchange of labor and etc and advanced information and communication technology, policies to activate sharing economy. Specialized services of Korean

sharing economy system such as Kozaza (guesthouse of Korean traditional house), bookshelves in national library has appeared and potentials of it have increased.

It is expected that even in the future, continued interest will be shown toward sharing economy. And good sharing economy services and enterprises will also be prospective in the future as well. The results of this study can be utilized as fundamental data to help understand the academic and industrial aspects of future sharing economy-related markets or consumer behavior.

In the present study, time-series web meta-data of existing literature was collected based on the sharing economy. However, relatively few data have been collected as 'big data'. Also, it did not collect the latest web meta-data such as 2015 or 2016 data. In future research, we will increase the quantity of data and increase the data collection term when analyzing. After that, we can expect more good results.

Reference

- [1] B. J. Kang, "Applied research of social enterprise shared economic system," *The Korean Association for Policy Studies* v.2012, No. 4, pp. 107-134, 2012
http://kiss.kstudy.com/journal/thesis_name.asp?key=3125928
- [2] C. W. Lim et al., "Shared value growth and the relational state model as a response to the global financial crisis in 2008," *Administration Collection of Writings*, Vol. 50, No. 3, pp. 295-326, 2012
http://kiss.kstudy.com/journal/thesis_name.asp?tname=kiss2002&key=3098001
- [3] T. H. No., "A Case Study : ICT and the Region-based Sharing Economy of a Start-up Social Enterprise," *Information systems review*, Vol. 18, No. 1, pp. 157-175, 2016.
<http://dx.doi.org/10.14329/isr.2016.18.1.157>
- [4] Y. Choi et al., "Effects of digital cultural capital on the perception of sharing economy," *Korean Journal of Communication Studies*, Vol. 21, No. 1, pp. 89-110, 2013.
http://kiss.kstudy.com/journal/thesis_name.asp?tname=kiss2002&key=3137287
- [5] K. Y. Kim et al., "A study on consumer preference typologing toward sharing economy service models based on collaborative consumption: A strategic approach to marketing communications," *Korean Society for the Scientific Study of Subjectivity*, no. 27, pp. 23-40, 2013.
<http://www.dbpia.co.kr/Article/NODE02385077>
- [6] Nipa(National IT Industry Promotion Agency), "The essence of this sharing economy by 'UBER' taxi and sharing bicycle 'LOCK8'," *Weekly Technical Trends*, No. 1641, pp. 27-34, 2014.
- [7] G. S. Jeong et al., "The Study of Availability and Factor Analysis on Car-Sharing for Sharing Economy," *Korean Comparative Government Review*, Vol. 19, No. 3, pp. 105-124, 2015.
<http://dx.doi.org/10.18397/kcgr.2015.19.3.105>
- [8] E. S. O et al., "A Study on General Sharing Behaviors in SNS," *Journal of Digital Disign*, Vol. 15, No. 4, pp. 191-198, 2015.
<http://www.dbpia.co.kr/Article/NODE06578686>
- [9] S. W. Shin, "Business model of design social enterprise for shared values," *International Design school for Advanced Studies*, Vol. 12, No. 6, pp. 383-401, 2013.
<http://www.dbpia.co.kr/Article/NODE02340650>
- [10] S. W. Kim et al., "Shared value creation and consumerism," *Korean Society of Consumer Studies Conference*, Vol. 2014, No. 5, pp. 196-201, 2014.
http://kiss.kstudy.com/journal/thesis_name.asp?key=3352096
- [11] K. Y. Hwang et al., "Applying sharing economy principle on transport with focus on car sharing practice and research," *Transportation Research*, Vol. 21, No. 1, pp. 35-49, 2014.
<http://www.dbpia.co.kr/Article/NODE02410064>
- [12] H. N. Maeng et al., "A Study on gamification and the evolution of sharing economy: Focused on 5 sharing economy-based websites," *HCI Korea*, Vol. 2014, No. 2, pp. 485-488, 2014.
<http://www.dbpia.co.kr/Article/NODE02374657>
- [13] Y. M. Lee, "A study on the smart work center model based on the sharing economy using the BMC," *The Korea Database Society* v. 20, No. 4, pp. 165-189, 2013.
<http://www.dbpia.co.kr/Article/NODE02365045>
- [14] J. Y. Yang, "Youth job creation measures through the

- activation of shared economic,” Korea Employment Information Service, 2013
<http://www.keis.or.kr/user/extra/main/2103/publication/reportList/jsp/LayoutPage.do?categoryIdx=130&pubIdx=1991&reportIdx=3415>
- [15] N. W. Kwack, “‘Sharing city seoul’ and a sharing city of ‘Global agora’,” *Marxism* 21, Vol. 10, No. 3, pp. 146-171, 2013.
<http://www.dbpia.co.kr/Article/NODE02228947>
- [16] Jeremy Rifkin, “The age of access,” Minumsa, 2001
- [17] Y. M. Kwon, “South Korea smartphone penetration, Second place in the IT developed countries,” *Asia Economy*, 2014.
<http://www.asiae.co.kr/news/view.htm?idxno=2014071617560046942>
- [18] S. W. Yang, “The economy of sharing the space has,” *Architectural Institute of Korea*, Vol. 57, No. 11, pp. 10-13, 2013.
<http://www.dbpia.co.kr/Article/NODE02274130>
- [19] S. Y. Lee et al, “Research on Key Success Factors of Social Authoring system : Focused on Linux and Wikipedia” *Review of Korean Society for Internet Information*, Vol. 13. No. 4, pp. 73-82, 2012.
<http://dx.doi.org/10.7472/jksii.2012.13.4.73>
- [20] Levy, P., “L’ Intelligence collective : pour une anthropologie du cyberspace”, *La Decouverte*, 1997.
- [21] J. C. Park et al, “Measures to take advantage of the collective intelligence of the Web 2.0 platform” *Review of Korean Society for Internet Information*, Vol. 8. No. 2, pp. 15-20, 2007.
<http://www.dbpia.co.kr/Article/NODE00903599>
- [22] Policy Research Division Convergence Policy Research Department, “Meet the new consumer culture and IT, ‘Sharing economy’,” *Trends and Prospects: broadcasting, telecommunications, radio* No. 67, pp. 33-45, 2013.
http://nbt.tta.or.kr/board/index.html?action=view&board_id=pds_a&seq=337
- [23] A. R. Kwon, “Suggest point and outlook of the shared economic growth associated with the development of IT business,” *KDB Bank*, 2013
http://rd.kdb.co.kr/er/wcms.do?actionId=ADDERERERWCE03&contentPage=/er/er/ERER27I00012_01RS.jsp
- [24] J. H. Lee et al, “Next-generation information mining trends” *Review of Korean Society for Internet Information*, Vol. 7, No. 1, pp. 53-66, 2006
<http://www.dbpia.co.kr/Article/NODE00825419>
- [25] C. W. Jeong, “Analysis of trend in construction using text-mining method,” *Journal of The Korean Digital Architecture · Interior Association*, Vol. 12. No. 2, pp. 53-60, 2012.
<http://www.dbpia.co.kr/Article/NODE01925709>

● 저 자 소 개 ●



김 재 원 (Jae-Won Kim)

Jae Won Kim received his B.S. degree from Mokwon University, Republic of Korea. He is currently a graduate student in Graduate School of Information, Yonsei University, Seoul, Korea. His research interest includes information system, ICT policy and industry, business strategy, and marketing etc.

E-mail : santiagok@yonsei.ac.kr



윤 유 동 (You-dong Yun)

You Dong Yun received her B.S. degree from Mokwon University, Daejeon, Republic of Korea. He is currently a M.S. degree in Dept. of Computer Science and Engineering, College of informatics, Korea University, Seoul, Korea. His main research interests are data mining, big data, and natural language processing, computer programing etc.

E-mail : 2015010492@korea.ac.kr



정 유 진 (Yu-jin Jung)

Yu Jin Jung received her B.S. degree from Mokwon University, Daejeon, Republic of Korea, in 2014. She is currently a M.S. degree in Multimedia Science from Sookmyung Women's University, Seoul, Korea. Her main research interests are situation awareness, distributed systems, big data, and prediction system etc.

E-mail : sdj4351@naver.com



김 기 연 (Ki-youn Kim)

Dr. Ki Youn Kim is an assistant professor in the Department of Marketing Information Consulting at Mokwon University, Daejeon, Republic of Korea. She received her Ph.D. and M.S. degree in Management of Information Systems at Yonsei University. She conducted researches on the fields of BI&A(business intelligence and analytics), marketing, social economy, CSR(corporate social responsibility), and ICT policies and industries.

E-mail : gracekim@mokwon.ac.kr