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Ph. D. Dissertation in Economics

**Research on User Participation for
Sustainable Media Environment
- Focusing on the Korean Media Market -**

February, 2020

**Graduate School of Seoul National University
Technology Management, Economics, and Policy Program
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Research on User Participation for Sustainable Media Environment

- Focusing on the Korean Media Market -

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Abstract

Research on User Participation for Sustainable Media Environment

- Focusing on the Korean media market -

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Technological advances in the media market have changed the media environment for users in all aspects. In particular, the advent of the Internet, smart devices, and advanced networking technologies provide an environment in which users enjoy diverse media content without limitation of space and time. Past studies explained these changes in the media environment with the concept of “hybrid media ecology,” which elucidates the phenomenon that blurs the boundaries between the factors existing in the media environment, thereby making it difficult to distinguish them.

In light of these changes, media studies have focused on the increasing role of users rather than other players in the media environment such as media, technology, and

communication. Especially, with the advent of Web 2.0, users' role as a "prosumer," a combination of producer and consumer, assumes significance. Users themselves prepare their knowledge content, and this user-generated content has influenced the behavior of other users, the media content market, and the mainstream media. In addition, social networks and collaborative intelligence generated by users have been utilized as the firms' assets.

This study aims to understand users' participation in knowledge activities such as creating, sharing, modifying, using information, and knowledge content, from the perspective of the media environment. By examining the association between the user, media, and knowledge content, intermedia relationship with users' participation, and media-user interactions which create a sustainable media environment are recommended. Three studies are used to verify the hypothesis using empirical analyses.

Chapter 3 examines how different types of media influence users' participation in the online community as a knowledge producer. First, the K-means clustering algorithm is used for segregating users into three groups based on their level of participation in online knowledge production, and I named the groups "active participants," "passive participants," and "bystanders." The Ordered Probit regression is applied to identify factors for making users "active participants." Lastly, Ordinary Least Squares regression is used to confirm media usage pattern differences between these user groups. The analyses involved 9,426 individuals from the Korea Media Panel (KMP) data, provided by the Korea Information Society Development Institute (KISDI). The results indicate

that, in terms of knowledge acquisition and accessibility, new media and traditional media play different roles. In particular, only smart devices have a significant impact on increasing active participants' participation.

Chapter 4 confirms the hypothesis that knowledge content produced by user participation motivates users to change their behavior again. In the gaming industry, people share and produce game-related information on a variety of media platforms, and these outlets have various modes of communication between the information senders and the receivers. Structural Equation Modelling (SEM) is used to build the research framework to recognize the intermedia relationship between the game and game-related media. The results indicate that the online community having game-related information produced by users has the greatest influence on users' attitude on the game and users' intention to play it. This chapter also identifies the intermedia relationship between the game and game-related media (online communities and live streaming services) and how they interact with each other. Users' experience from game playing generates users' attitude towards the game, and this attitude influences users' intention to utilize game-related media. Conversely, users' attitude towards game-related media affects users' intention to play the game. In other words, the game generates user-generated content comprising game information, and user-generated game content prompts other users to actually play the game.

Chapter 5 focuses on the moderating effect of user participation towards the impact of media usage on users' psychological well-being. Users' psychological well-being is an

important factor in the media environment. Not only does it lead to users' continuous use of media, but importantly, it is also considered as a criterion by media policymakers to implement regulation or deregulation of the media services. The direct and indirect effects of media usage on users' psychological well-being were investigated. The results indicate that media usage has a negative or an insignificant effect on users' psychological health directly, but there could be indirect positive effects of media usage, which promote users' knowledge participation and has a positive effect on psychological health.

In order to recommend factors for the sustainability of a contemporary media environment, this study looked at the role of media in users' knowledge production activities and participation, as well as the function of media in "healthy" participation and intermedia relationships. The results showed that traditional and new media have different influences on users through different levels of interaction. In addition, the knowledge content generated by users connect various media with each other, allowing the media ecosystem to expand and make it sustainable. Therefore, this study proposed the role played by new media and the direction towards which it should develop in the future as "constructing a sustainable media ecosystem through the promotion of user participation."

In addition, two strategies are proposed to maintain a sustainable media environment: First, traditional and new media should complement each other's roles and be properly used for the continuous production of user-generated knowledge, which holds an important value in the media environment. Second, media professionals should understand the mechanism of intermedia interaction mediated by users' participation and

utilize it to develop and maintain media services.

The results of this study could be used to establish marketing strategies in industries that utilize the media to establish policy goals and achieve social innovation that should be accomplished through user participation.

Keywords: New media, User participation, Knowledge production, Media environment, Sustainable media environment

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Chapter 1. Introduction

1.1 Research Background

The media industry has changed significantly due to the emergence of new digital technologies, such as the Internet (Choi, 2018). The rise of the Internet has reduced production and transmission costs, and the emergence of smart devices and wireless Internet has created an environment in which users can access media content anytime and anywhere. Figure 1 shows an example. In the past, users could enjoy the desired broadcast content only at certain places (mainly in the living room or the bedroom) where the television (TV) was situated during airtime. Today, however, users can watch any content they want from any location at any time through the Video On Demand (VOD) service through various devices such as smart phones, tablet PC, TV, and laptop. In addition, the role of users was just as a consumer, or information receiver in the past. However, now, users can contribute to media content production, and they can communicate with the broadcasting distributor. In mass media, for example, radio listeners can send messages to a radio host in real time. As broadcasting channels have become diversified and content distribution through the Internet platform has become possible, the ability to create media communication has become common. Now, anybody can send out a "broadcast" over the Internet; as a result, media channels have become diversified, a targeted group can be specified, and interactive media communication is a reality. As a result, many people have become information transmitters and content

generators. User-generated content (UGC) produced in this way targets segmented receiver groups. UGC, which usually focuses on a specific industry (game industry, food industry, etc.) and provides diverse information about that industry, has gained popularity. Information receivers can easily obtain desirable industry-specific information through UGC. In addition, information receivers can obtain different levels of knowledge from diverse providers in various formats. As seen, UGC sharing platforms, YouTube, Wikipedia, and Flickr, become meeting platforms for a range of “grassroots creative communities,” with each not only pursuing their own goals, but also helping to shape the overall media environment (Jenkins & Deuze, 2008).

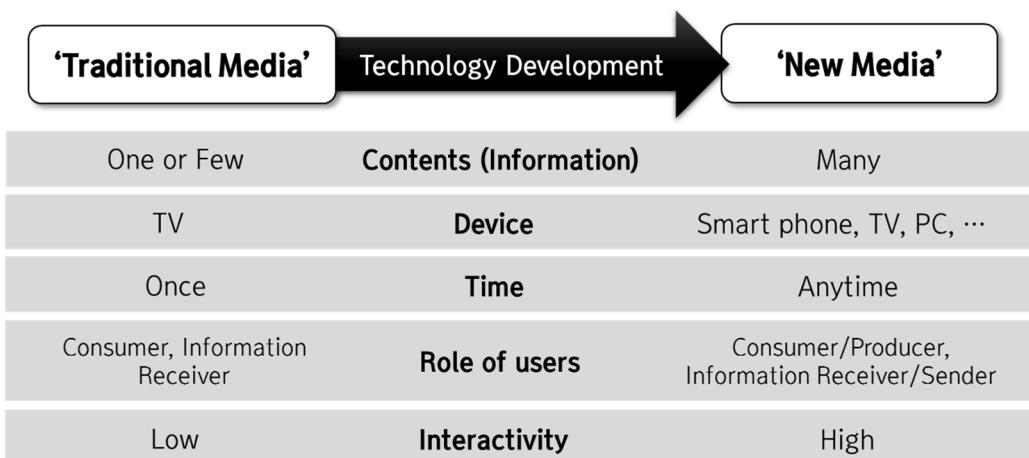


Figure 1 Diversified media content use time, location, and device

In other words, new technology has changed the media environment, and user experiences have also changed within the changing media environment (Correa, Hinsley,

& De Zuniga, 2010). Additionally, the most important change in the contemporary media environment is that the weight of the users' rights and roles has increased. In the same context that this thesis described the emergence of user-generated content previously, these changes have become apparent since the mid-2000s as devices and systems in the media environment have evolved to raise the level of control and authority of users. Examples include media devices like the computer mouse, TV remote control, and a joystick or interfaces such as user recommended systems (Deuze, 2007). People were also engaged in 'we media' such as Wikipedia and GitHub to make a collaborative production (Bowman & Willis, 2003). These changes have greatly helped the society as it has been used to solve social problems or diffuse social activities.

In addition, 'Web 2.0,' which has emerged after 2010, not only defines the role of users as a prosumer, a combination of producer and consumer (Ritzer & Jurgenson, 2010), but also made users become innovative (Kim, Altmann & Hwang, 2010). With this Web 2.0-based social media, people are encouraged to post their own user-generated content, and it is widely used by users (Obar & Wildman, 2015). According to Greenwood, Perrin & Duggan (2016), 79% of internet users (68% of all U.S. adults, 34.0% of Korean SNS users) use Facebook, and 32% of internet users (28% of all U.S. adults, 10.8% of Korean SNS users) use Instagram. With social networking services such as Facebook, Twitter, and Instagram becoming a major part of people's lives, the media environment has become mainly driven by user participation.

1.2 Problem Statement

Despite the importance of user participation in a contemporary media environment, there are research gaps in understanding users' participation and the media environment, respectively.

First of all, user-centered media studies, especially user participation research, have been mainly focusing on political participation, or it has seen overly simple participation, like "being a part of some clubs." In journalism studies, media and political participation have become an important issue because it sees the effect of news media on civic engagement or participation related to the news. Accordingly, there have been studies that TV programing increases political participation (Norris, 2000; Rojas, Shah, Cho, Schmierbach, Keum & Gil-De-Zuñiga, 2005), and that new media platforms such as social media are positively associated with political participation (Lee, Shin & Hong, 2018; Valenzuela, Somma, Scherman & Arriagada, 2016; Boulian, 2015). However, seeing users' participation in knowledge activity can suggest more fruitful implications in the media environment. Users' participation in knowledge activity is defined as "knowledge collaboration," the modification, accumulation, and recombining of knowledge (Faraj, Jarvenpaa & Majchrzak, 2011). This knowledge collaboration in diverse media platforms have developed a variety of innovative products with information and knowledge production (Park & Park, 2016). So, by understanding users' participation in knowledge activity, we can also comprehend the mechanisms of new

value creation like user innovation.

Second, in spite of that, it becomes increasingly important to understand the complex nature of the media environment (Livingstone, Grandío, Wijnen, Costa & Papaioannou, 2013), and the need to understand the transformation of the media environment from a diachronic perspective (Dahlberg-Grundberg, 2016; Rinke and Roeder, 2011). There are very few research works that see the media environment with an intermedia relationship or systematic approach. The digital and the non-digital, the mainstream and the alternative, the online and the offline, and those boundaries become even more blurred (Mattoni, 2017). With this stream, the Intermedia relationship between the new media (SNS) and the mainstream media (the TV, radio, and newspaper) was studied in the journalism sector recently, but the volume of literature is very small (Rogstad, 2016; Conway, Kenski, & Wang, 2015; Kim, Gonzenbach, Vargo & Kim, 2016; Guo & Vargo, 2018; Vonbun, Königslöw & Schoenbach, 2016). Also, media ecology studies have been conducted in a conceptual way. Most of the media environment studies introduced the biological concept of ecology in media research, and tried to apply the biological metaphors to the media environment (Scoli, 2012). Media environment studies and the studies related to real media cases should be balanced.

Third, the new media theory explaining the emergence of new technologies, and research related to media convergence, can be explained together under the concept of media environment, but each has been done separately. The new media research has been evolved into empirical and theoretical studies whenever a new medium is introduced due

to technological advances under the long tradition of social science research (Livingstone, 2006). Media convergence theory has been used mainly in research on media culture in the creative industry rather than in the view of technological development, since Jenkins (2004) argued that “Media convergence is more than simply a technological shift. Convergence alters the relationship between existing technologies, industries, markets, genres and audiences.” However, both theories can be understood together using the media environment concept, as media convergence theory explains that new technologies consequently redefine the media environment, and digital culture, which derived from new media theory, explains about media systematically. In addition, there is a commonality in both theories in the argument that technological advancements increase user participation within the media environment (Deuze, 2005; Jenkins, 2004).

1.3 Research Objectives

As outlined in the problem descriptions, this study aims to understand users' participation in knowledge activities like creating, sharing, modifying, using information and knowledge content, with media environment perspective. By examining the association between the user, media, and knowledge content, intermedia relationship with users' participation, and media-user interactions which forms a sustainable media environment are recommended. Three studies are used to verify the hypothesis with empirical analyses.

The first study aims to verify the relationship between users' participation and media usage. This study examines how different types of the media influence users' participation in the online community as a knowledge producer. Especially, this study divides media into traditional (mainstream) media and new media, and sees the role differences between them.

The second study focuses on user-generated content which is the result of users' participation in knowledge activity. Considering the different kinds of communication methods and user-generated content ecosystem, the gaming industry is selected to identify the relationship between user-generated content with media and users' behavioral change. In the gaming industry, there are diverse game-related media that conveys game-related information content including user-generated content. Different kinds of game-related information content are distributed, and these affect users' attitudes toward the

game and their intention to play the game. The intermedia relationship between the game and game-related media which is mediated by users' participation is recommended in this study.

The third study aims to identify the mediating effect of users' participation on the impact of media usage on users' psychological well-being. Users' psychological well-being is an important factor in the media environment. Not only does it lead to users' continuous use of media, but it is also importantly considered as a criterion by media policymakers to implement regulation or deregulation of media services.

1.4 Research Question

Based on the research problems and the research objectives, the framework of the media environment driven by users' participation is formulated as Figure 2. It consists of (a) the relationship between media and users' participation, (b) the relationship between user-generated content with media and users' behavioral change, and (c) the relationship between media, users' participation, and users' psychological well-being.

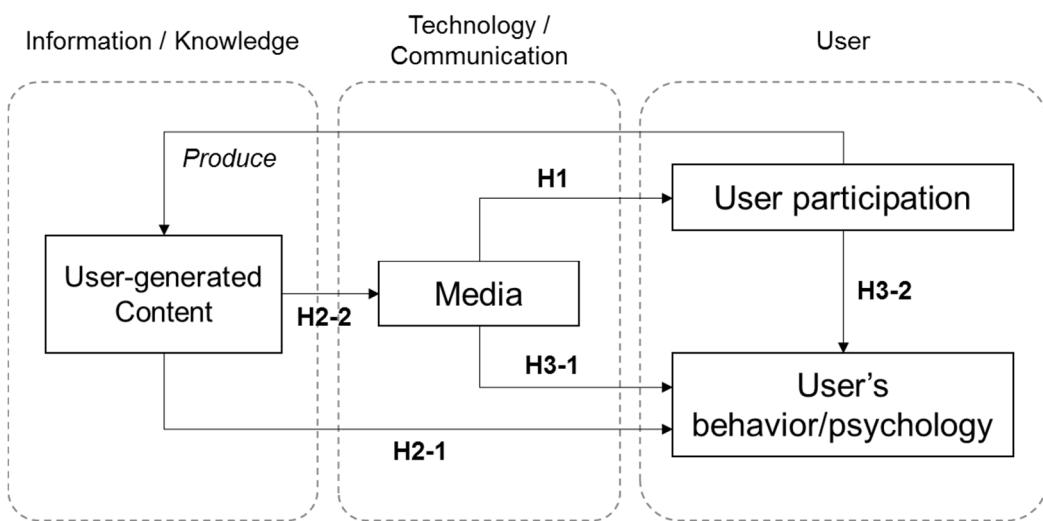


Figure 2 The framework of the media environment driven by user participation

The overall research question and the four main hypothesis regarding the sustainable

media environment are as follows:

- How does users' participation in knowledge activity drive sustainability in a contemporary media environment?
 - How does the media landscape influence users' participation in knowledge activity on media environment?
 - How does the result of users' participation in knowledge activity, the user-generated content, affect intermedia relationship and users' behavioral change again?
 - Does users' participation in knowledge activity in the media environment have a mediating effect on the impact of media usage on users' psychological well-being?

The first subset of research questions on the relationship between media and users' participation in knowledge activity on media environment is going to be verified by the following hypothesis.

Hypothesis A: Media use affects users' participation, depending on the media communication method & whether it is new media

The second subset of research questions on the association between user-generated content with media and users' behavioral change are going to be verified by the following

hypotheses.

Hypothesis B-1: User-generated content leads to users' behavioral change depending on the media communication method

Hypothesis B-2: User-generated content affects the inter-media relationship

The third subset of research questions on the relationship between media, users' participation, and users' psychological well-being are going to be verified by the following hypotheses.

Hypothesis C-1: Media use affects users' psychological well-being

Hypothesis C-2: User participation mediates the effect of media usage on users' psychological well-being

1.5 Thesis Outline

This thesis consists of seven chapters with three essays. Chapter 1 provides the overall outline of the dissertation, while Chapter 2 reviews the overall theory of contemporary media environment, evolution in media research, users' participation, and the Korean media environment. Three essays test the proposed hypotheses in Chapters 3, 4, and 5. Chapter 6 examines the results of the essays and discusses the managerial and political

implications. Finally, Chapter 7 concludes this dissertation and suggests two factors for sustainable value creation in the contemporary media environment. Figure 3 shows the overall outline of this dissertation and each topics, methodologies, and data in Chapters 3, 4, and 5.

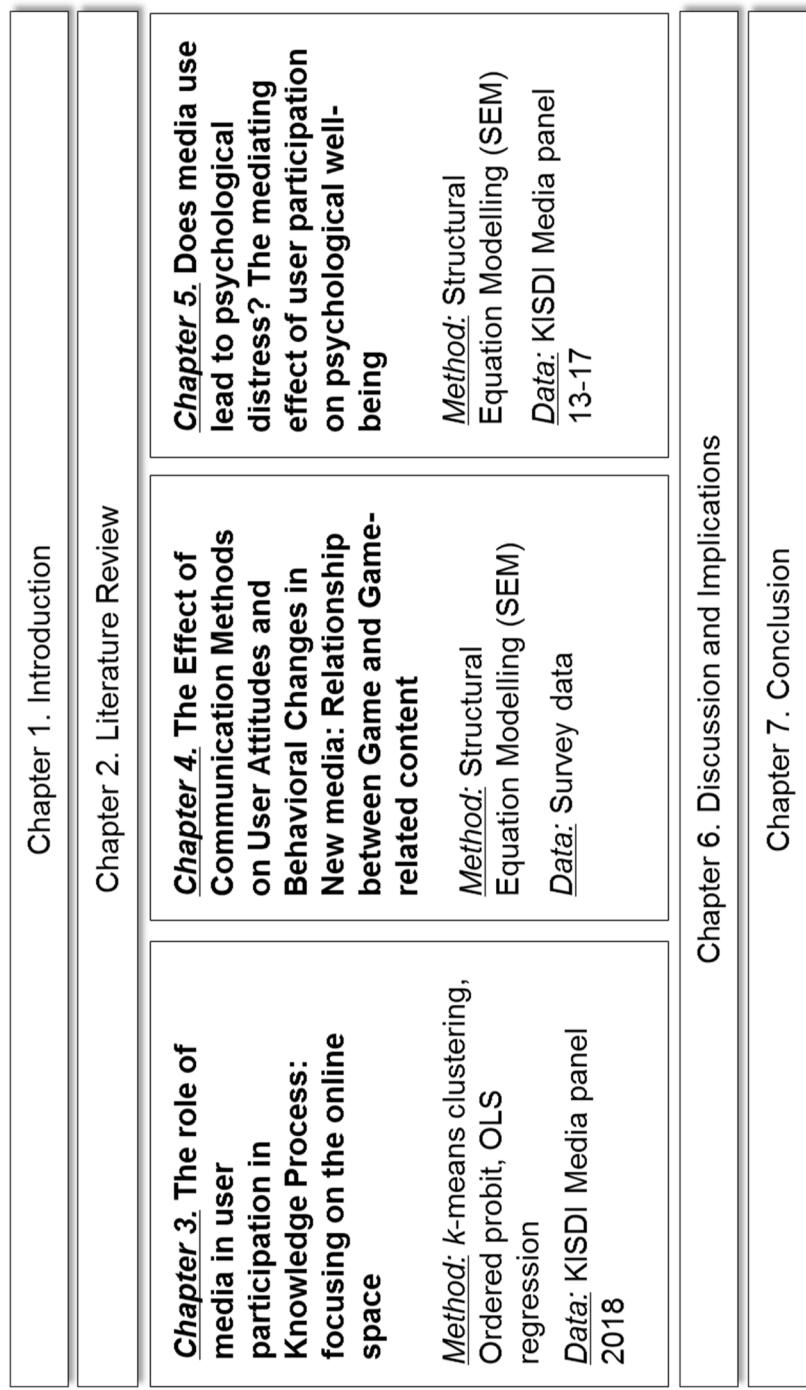


Figure 3 Thesis outline

Chapter 2. Literature Review

2.1 Media Environment

To understand media environment, it is essential to understand the concepts of media ecology, medium, human beings, and interaction (Scolari, 2012). According to Postman (1980), media ecology is the study of media as environment, where people live like fish in a media environment, just as fish live in water. Nystrom (1973, p.1) also argued that media ecology should be understood “complex communication systems as environments.”

McLuhan explained media ecology that “media ecology means arranging various media to help each other so they won’t cancel each other out, to buttress one medium with another.” (Theal, 2006), and this is connected the speech of Postman (1998) in Denver, “A new medium does not add something; it changes everything”. All the factors within a media environment don’t operate separately, but systematically that one new change occurs and all the remaining factors interact organically together.

Scolari (2012) reviewed media ecology studies, and said that media ecology studies have interpreted ecological metaphor in two ways, environment or intermedia relationship. He also suggested four new concepts: evolution, coevolution, interface, and hybridization which are metaphor to describe the convergence of new media and convergence phenomenon that lead by technology development, and tried to explain conventional media environment with these four concepts. According to his explanation, the concept of evolution and coevolution are useful when describing the history of technologically

mediated communication and the relationships between different media. Interface is a minimal unit in media ecology, and this can be flexibly applied in studies of human-computer interaction and interaction design, which are newly emerging fields with appearance of new interactive media. In addition, hybridization is a concept which is used to explain a very new media like iPhone, in a convergence process.

Therefore, the studies of media ecology and media environment were intended to systemically describe human and media, technological advances, and interaction relationships. To understand the individual characteristics and relationships of each factors in media environment, understanding the mechanism of this media environment system has to be proceeded. However, contemporary media environment is changing faster and becoming more complex, because new technologies have been emerged faster and faster, and this is making it difficult to understand the characteristics and mechanism of media environment. Benkler (2006) explained that over the fast decades, the expansion of the new media has caused "hybrid media ecology," which causes factors in the media environment interact with commercial, governmental, amateur, educational, nonprofit, activist and other players in more complex way. Also, it is categorized by the digital and the non-digital, the mainstream and the alternative, the online and the offline and those boundaries become even more blurred (Mattoni, 2017). The term 'hybrid' means 'a situation in which the borders between remote and contiguous context no longer can be clearly defined' (Dahlberg-Grundberg, 2016).

Contemporary media ecology studies stressed that distinguishing the parameters

separating media, technology, communication, and their users becoming less feasible (Bimber, Flanagin & Stohl, 2005; Jurgenson, 2012). Media ecologies approaches also point to the need to understand transformation of media environment in a diachronic perspective (Dahlberg-Grundberg, 2016; Rinke and Ro̠der, 2011).

2.2 Media Research Evolution

With contemporary media environment brought by information and communication technology (ICT), digitization, convergence and move from mass to network communication were the main issue in media research area (Fourie, 2017).

In the early 2000s, media researches focused on digitalization and computer mediated form of communication, production, and distribution of content. Manovich (2001, p. 19) talking about the *New Media Revolution*, arguing that in the middle of the new media stream, not only all cultures are changing from computer-mediated form of communication, production, and distribution, but also the convergence of media content, form, characters, and sensibilities is creating a new culture. New media is explained as “digital media that are interactive, incorporate two-way communication and involve some form of computing (Logan, 2010),” mostly focusing on the interactivity of a medium. However, the term of ‘new media’ is not mainly used to understand each media, but to explain media culture, with Livingstone (1999)’s arguing that the time scale for ‘newness’ is not obvious but the time scale for social change is relatively observable. Thus, modern media culture has been described as cyber culture (Léby, 2001), information culture (Manovich, 2001), Internet culture (Castells, 2002), or digital culture (Gere, 2009).

There are two views in media convergence literatures. First is seeing media convergence as an extension of industrial convergence. Those are share the tone together with industry convergence studies which view convergence from three perspectives: (a) industrial alliances and mergers, (b) the combination of technology and platforms, and (c)

the integration between markets and services (Wirtz, 2001; Chon, Choi, Barnett, Danowski, & Joo, 2003). So the horizontal and vertical integration of firms among broadcasting, telecommunication, publishing, cable, film, and computer software sectors have been regarded as media convergence. Second is seeing media convergence with diverse dimension. Jenkins (2001) described the changing media environment of technology development as media convergence, stressing that media convergence is not just a field into one (meld into one), but an ongoing process generated by media technology, industry, content and users. He stressed that ‘new technologies bring together different mediums and consequently redefine the media environment.’ (Jenkins, 2006). In particular, he also argued that changes in information technology and communication method would change and reset users' daily lives. In particular, he not only emphasized that media convergence is all about existing technologies, industries, markets, media genres, and user relationships, but also argued that not just changes in technology in the media environment, but considerations at various levels are needed (Jenkins, 2004).

New media theory and media convergence studies have been done separately that while new media theory is applied to examine new media services or devices in media environment, media convergence sees merger and acquisition in media environment. However, these two research streams both tried to understand the changes in media environment that boundaries in media communication, format, technologies, industry, content, and users are blurred and changed. Especially, they shed light on the user's role

change in media environment. The emerging new media ecology gives users increasing control over the media like remote control, computer mouse, and joystick devices, or searchbots and user recommended systems (Deuze, 2007). People engaged in the collaborative production in ‘we media’ like Wikipedia and GitHub, the participatory levels in those platforms are increasingly being higher (Bowman & Willis, 2003). In addition, one of the features of digital culture is that the level of participatory production in the media system increases (Deuze, 2005). Jenkins (2004, p.93) argued that the convergence promotes a new participatory culture by providing the public with tools to modify, archive and recirculate content. Also, the user as co-creator of corporate product view is explained in diverse disciplines like innovation and marketing area (Leckenby & Li, 2000; Balnaves, Mayrhofer, & Shoesmith, 2004; Benkler, 2006; Hartley, 2005; Jeppesen, 2005; Jenkins, 2006).

After 2010s, ‘New media’ had not been a ‘new’ concept anymore. With the emergence and diffusion of Web 2.0 and participatory culture, it enabled the social component of web use. There have been many studies related this phenomenon, with the concept of “Social media.” Social media is defined as (a) (currently) Web 2.0 Internet based platform, (b) User-generated content is the lifeblood of social media, (c) people and organization create user-specific profiles for a platform of social media service, and (d) social media services facilitates the development of social networks online (Obar & Wildman, 2015). Web 2.0 is describing users’ role of “prosumer”, a combination of producer and consumer (Ritzer & Jurgenson, 2010). Also, it serves a platform for publishing and creating content,

and content can be “continuously modified by all users in a participatory and collaborative fashion” (Kaplan & Haenlein, 2010). Because social media concept is including users’ brisk participation in communication and content creation, the level of user participation is not considered privately in social media studies. The effect of social media and social network on marketing (Lamberton & Stephen, 2016) or news sharing (Kümpel, Karnowski & Keyling, 2015) have been the main issue in media studies recently.

2.3 User participation and knowledge production

2.3.1 Traditional knowledge producer: news media

It was news media, described by mass media, that provided information in traditional media. Traditional media, represented by TV, radio and newspapers, has been going through from a fundamental paradigm shift since the end of the 20th century (Huang, Davison, Shreve, Davis, Bettendorf & Nair, 2006). Large news media companies such as The Washington Post often take over various media platforms such as local newspapers, online news operations, television stations, and radio stations to distribute news content. This trend in media convergence in the news industry has raised the issue of how this convergence has changed the way information is communicated through the media. (Huang et al., 2006).

In the Journalism study, there are two different views on the changes in information quality caused by media convergence and the effectiveness of readers. First of all, in the view of journalism, there are studies that horizontal combination in the market caused by convergence undermines the diversity of information. According to these studies, especially Cross-ownership both a newspaper and a television station from the media convergence stream limits the number of information, so it can pose a threat to democracy. (e.g. Foster, 2002; O' Connor, 2002; Tompkins and Stencel, 2002).

In particular, Summerfield (2000) argued that the acquisition of ownership component

in the media market would narrow the range of operations and fact, which would be disadvantageous for media consumers. In the same vein, Haiman (2001) said that while convergence would be a very good opportunity for media companies, however, it would have very bad consequences for journalism. According to Robert Haiman, in short, ‘Convergence is the enemy of quality journalism.’

The opposite view also exists. The benefits of media convergence are user, viewer, and reader (Carr, 2002). Carr argued that convergence results in more frequent information sharing on the media platform, which improves each platform's newsgathering capabilities, thereby improving the quality of service to consumers. This frequent publish in the platform pushes other partners and competitors as well, so consumers can be benefited. In addition, Tonpkins (2001) argued that even after the convergence of news media, users would benefit from high interactivity among newspapers and specialized content if newspapers created local specialized content for television stations or, conversely, television stations allocated their broadcast time to newspapers.

2.3.2 User participation in traditional media

Media convergence due to the advent of new media has increased the public's "participation" in news media itself. Over the past century, the level of participatory production in media systems has been increasing slowly (Deuze, 2005). There have been persistent calls in mainstream journalism studies to continue to prepare for the changing times, such as "we media" and "participatory news." Gilmor (2006) argued that news is evolving into a collaborate, a participatory format and that everyone can become a journalist. He also asserts that peer-to-peer news will destroy business-to-consumer news. The *American Press Institute* also argued that existing media companies should carefully examine peer-to-peer news and learn how it produce content to attract consumers, and modify the information delivery storytelling form (Deuze, 2006). Jenkins (2004, p.93) also called the change "cultural convergence," arguing that this convergence promotes a new participatory culture by providing the public with tools to modify, archive and recirculate content.

2.3.3 Newly rising knowledge producer: general public

Mass media, which had a stable presence in the mainstream, faced competition from the constantly mutating information and entertainment source, in other words, personal digital devices that let people connect to each other through interactive technology (e.g. PC, mobile phone, Smartphone, etc...) (Quandt & Singer, 2009).

In addition, media convergence enabled users to upload content directly to the Internet, making it easier for the public to access such content (McPhillips & Merlo, 2008). Content is increasingly being made “for the people, by the people”. This trend is consistent with Manovich (2001, p. 19) talking about the *New Media Revolution*, arguing that in the middle of the new media stream, not only all cultures are changing from computer-mediated form of communication, production, and distribution, but also the convergence of media content, form, characters, and sensibilities is creating a new culture. These culture has been described as cyber culture (Léby, 2001), information culture (Manovich, 2001), Internet culture (Castells, 2002), or digital culture (Gere, 2009). In particular, Deuze (2006) proposed three proxis of ‘digital culture,’ that individualization, globalization, and postnationalism of news and information makers, and online users. In this context, he defined the form which allows anyone to upload information and news without a specific format or filtering process, such as user-generated content or "we

media," as the new information production and dissemination platform, "indymedia," a genre of a journal. Indymedia is also described as an independent media center (IMC), which includes individualized online storytelling such as blogging and podcast (Deuze, 2006). In particular, this is described as so-called radial online journalism or alternative news, where "radical" means that the dichotomy, traditionally divided into news producers and news consumers, is converged (Atton, 2004). In addition, Pavlik (2000, p.234) said that technological advances fundamentally reshape news organizations, journalists, and their public including listening audiences, competitors, news sources, sponsors and those who seek to regulate or control the press. He also mentioned digital culture, with arguing that the existing global/local and producer/consumer divides were meaningless and instead that, the degree of interaction or openness of participation in storytelling were alternative distinctions nowadays, reducing the gap between indymedia and journalism (Deuze, 2003).

2.3.4 User participation in new media: Online Community(OC)

User generated content, previously described as a type of Indymedia, has been transformed various forms of video, photography and music by advances in ICT technology. Therefore, various kinds of content, as well as news information, were produced explosively, and depending on the type of content, platforms for photo sharing (e.g. Pinterest, Flicker), video sharing (e.g. YouTube, Vimeo) and sound sharing (e.g. Sound cloud) were developed. In addition, various online communities were created depending on the kind of knowledge shared.

Especially, online communities are defined as open collectives of individuals achieving collective welfare by enhancing common interests (Sproull & Arriaga, 2007). With the advent of social media, joining the online community has become an increasingly popular activity for Internet users in recent years (Wang, Chung, Park, McLaughlin, & Fulk, 2012). People who are included in an OC communicate, interact, and develop relationships through IT-supported virtual space (Lee et al. 2002), and this IT-supported space helps build stronger intelligence than offline organization (Luo et al., 2009). In addition, the absence of social characteristics (e.g., gender, age, social and professional status) and anonymity in the online space allows users to communicate more

pleasantly and freely to other users. These characteristics of OCs have a positive impact on achieving the various purposes of communication, as well as on equal and effective participation at computer mediated communications (Walther, 1992). In this context, related studies have provided empirical evidence that positive, socially rich, and relational behavior in the online community can enhance users' participation by enhancing social bonding (e.g., Walther, 1992; Tidwell & Walther, 2002; Utz, 2000). Development of online platforms has been expected to not only generate an unprecedented evolution of organizational knowledge (Lykourentzou, Vergados, Kapetanios & Loumos, 2011) but also provide an effective solution for social problems (Luo, Xia, Yoshida, & Wang, 2009). Therefore, a number of studies have tried to discover ways of how to use online community for knowledge collaboration.

2.3.4.1 Characteristics of user participation in OC

The sharing and creation of knowledge in online space is led by users. However, not all users have the same role in knowledge production activity. Users who transfer or produce new knowledge take an important role in the online community and sometimes those users are likely to create new communities to create and store their knowledge. Because of its importance, this type of user has been classified as "opinion leaders." An opinion leader is a person who communicates information about any subject to others (King & Summer, 1970), and the information they spread attracts a change in behavior of opinion seekers, so it is very important to analyze their behavior. Users who are not

opinion leaders are classified as “opinion seekers” and, in particular, the opinion leader-seeker divide has been studied in the consumption category. Chan (1990) presented the attributes of an opinion leader in four aspects. The first characteristic is topic relevance which refers to their interest and accumulated knowledge. The opinion leader’s quantity of knowledge determines the volume of whole knowledge, and interest is necessary to input a great amount of cognitive effort. Second, the opinion leader group has demographic characteristics. They are younger, have a higher education and income and show greater social mobility than the non-opinion group. Third, personality traits such as dogmatic decision making, innovativeness, venturesome, confident, and socially active can be used to identify the opinion leader. Last, media habits may be a clue for distinguishing the opinion leader from the opinion seeker. The opinion leader group is likely to be more exposed to media, which is an information intensive source.

There is also the point of view that users are classified into levels of involvement in the themes of community and central activity. Kozinets (1999) suggested that users who are strongly associated with community activities and topics are “insiders”; strongly related to the topic but weakly involved in activities are “devotees”; users who have strong social ties but unrelated topics are “minglers”; and those with weak social ties and connections with topics are “tourists.” He argued that insiders and devotees have a “lead user” character and thus a strong influence on innovation-related opinions (Kozinets, 2002). In addition, Lyons and Henderson (2005) argued that enduring involvement (Jang & Lee, 2000) can contribute to opinion leadership. Although some studies have

emphasized that the opinion leader often aggravates the quality of group decision makings (Størseth, 2018), this is supported only when the leader is dogmatic. Without unilateral leadership, the existence of an opinion leader in an online community doesn't decrease the quality of group decision-making (Breitsohl, Wilcox-Jones & Harris, 2015).

2.3.4.2 Use of technology and user participation in OC

Use of technology is one of the important issues regarding knowledge activity in online space. This is because the acquisition of information through various media indirectly affects the attitude or value of users. There are many studies that have seen the effect of SNS, which is estimated to be gradually replacing traditional information media such as television, newspapers, and radio (Osatuyi, 2013). Constantinides and Fountain (2008) argue that social media provides a network that facilitates the flow of ideas and knowledge. These networks are created allowing efficient generalization, dissemination, sharing and editing of informational content. Through the networks provided by social media, consumers have led communication in the marketing process (Zhang & Lin, 2015), and customer involvement has occurred for service innovation (Corte, Iavazzi & D'Andrea, 2015). In addition, some articles have explored how product information acquisition in SNS and blogs affect actual purchase intention, satisfaction (Pinto, 2015), and purchase behavior.

Furthermore, media usage is relevant to various skills to enhance information capacity. In particular, the computer mediated environment requires computer skills that enable users to explore requisite information successfully and to cope with various problems

(Hoffman & Novak, 1996). About, Lyons & Henderson (2005) concluded that skills for ICT are significant factors to distinguish opinion leaders from non-leaders and Hao, Padman and Telang (2011) suggested that there is evidence for the relationship between opinion leadership and new technology adoption.

2.3.4.3 Individual motivation for user participation in OC

Individual motivation is the key driving force of an online community, because there are few incentives for their participation. Based on Maslow's (1943) hierarchy of needs theory, Grosso (2001) argued that individual needs may be satisfied during participation in online communication. Similarly, Bishop (2002) suggested that online communities basically provide users with "deficit needs" and that "higher being needs" could be met. These studies explain the motivation for behaviors in the online space such as knowledge sharing, production, and modification (Bishop, 2007). In addition, a strong and consistent incentive system could also motivate participation in knowledge collaboration in the online space. Hall (2011) classified the incentive as "hard (explicit) rewards" and "soft rewards." A hard (explicit) reward is an economic reward, learning opportunities, and career advancement, while soft rewards enhance reputations and personal satisfaction. Besides either psychological aspects or incentive systems, the organizational ownership of their information and expertise and the strong belief toward incentives also becomes a source of knowledge sharing in the group (Jarvenpaa & Staples, 2001). In sum, both individual needs and external incentives can be the catalysts for knowledge collaboration in an online community (Bock & Kim, 2002).

2.4 User communication in media environment

Traditionally, communication in media is divided into two modes, mass communication and interpersonal communication. Traditional media such as broadcast TV and radio are technologically-mediated modes with one-way messaging from content producers to consumers, and deliver the same content to large audiences at the same time. Thus, they are referred to as mass communication (O'Sullivan & Carr, 2018). The one-way communication between the information sender and recipient of traditional media became two-way communication through the introduction of the Internet, which greatly changed the ways that people interact, gather, and obtain social-emotional support (Castillo, 2019). This change facilitates how people use interpersonal communication, as two-way communication, when transmitting information in media environment. As a result, interpersonal communication, which is defined as (a) two-way and (b) involving a very small number of participants, has been the main communication model in new media such as e-mail, online communities, and social networking services.

Over time, new communication formats with two-way communication and large numbers of participants have appeared such as Facebook, YouTube, and Instagram, in media convergence environment. On these platforms, users can easily post content and

information they want to share to large numbers of recipients. In addition, thousands of viewers of live streaming platforms such as TwitchTV watch broadcasts that allow two-way communication between streamers (broadcast producers) and other viewers. These are new types of mass communication that combine news, pictures, videos, and music. The emergence of such communication types is gradually blurring the boundaries between mass and interpersonal communications. Studies of new forms of communication include research on intimate interpersonal ties in new media environments such as online gaming communities and video sharing platforms (e.g. see Kobayashi (2010) and Maghrabi, Oakley, & Namati (2014).).

The emergence of new technologies and new forms of communication challenge existing communication theories (O’Sullivan & Carr, 2018). In the late 1980s, Reardon and Rogers (1988) pointed out that research and theories about the divide between mass and interpersonal communication represent a false dichotomy. Recently, scholars have endeavored to modify or improve theories of communication. Media grafted onto the Internet have been described as “blurring” the boundary between mass and interpersonal communications (Morris & Organ, 1996), and also as “blending” because such media perform the roles of both mass media and social media (Haridakis, & Hanson, 2009). However, the continuing emergence of new digital communication media in media convergence environment has made it difficult for existing research to remain up to date, so the need for new definitions in communication has been highlighted (Cathcart & Gumpert, 1983; Reardon & Rogers, 1988). Consequently, various studies have tried to

explain changes in media communication using new definitions rather than existing definitions.

O'Sullivan (2005) first defined masspersonal communication to describe cases in which mass media are used for interpersonal communications or interpersonal media are used for mass communications. In other words, masspersonal communication describes a situation in which a user participates in interpersonal communication and mass communication (or mediated communication) at the same time, i.e. converged format of mass and interpersonal communication. Since O'Sullivan (2005), a number of studies have described or defined social media platforms as masspersonal (Carr & Hayes, 2015). O'Sullivan and Carr (2017) suggested a new classification model based on the degree of personalization and accessibility to content (information), which divides modes of communication into mass communication, interpersonal communication, and masspersonal communication.

2.5 Sustainability of Media Environment

Sustainability is a concept that is linked to long-term thinking (Grunwald, 2001).

There are very rare studies in media area that applied sustainability concept. In the view of business model, Krombholz, Merkl & Weippl (2012) saw that Facebook ecosystem's sustainability is threatened by fake user profiles. They argued that the sustainability of Facebook is determined by users' activities based on their real-life, and revenue from the advertisement targeting users. Similarly, Krasnova, Günther, Spiekermann & Koroleva (2009) argued that users' privacy concerns hinder the sustainability of social network in Facebook, so alleviating user concerns is essential for sustainable growth of Facebook.

There were another views that tried to see sustainability or sustainable development in service industry. From the shift to knowledge society, the value of the factors 'knowledge' and 'information' have been getting higher (Basmer, Buxbaum-Conradi, Krenz, Redlich, Wulfsberg & Bruhns, 2015; Kim & Altmann, 2013). With the created knowledge and information, other values such as innovation are consistently generated through the ecosystem. Thus, Spohrer, Giuiusa, Demirkan & Ing (2013) said, "knowledge is the root of all human-intangible service capabilities in a service ecology." Enquist, Petros Sebhau,

& Johnson (2015) highlighted that to achieving sustainability, various actors in an environment should be able to combine their resource, knowledge and information in a common value creating network.

To sum up, to see the sustainability and sustainable growth of something, it is important to understand the value creation mechanism. In the Facebook sustainability studies, users' activities, and business model through the users' networks and participation was essential factors of value creation. In service industry studies, knowledge and information are the essential resource for the value chain in service sectors. Because the definition of the term is vague and there are many different views on sustainability (Burger, 2006), it is important to know what is the goal from applying the sustainability concept. In this study, I would like to see the value creation from users especially knowledge and information contents, and the relationship between the factors in the media environment.

2.6 Media landscape in South Korea

According to the International Telecommunication Union (2016), Korea ranks first in the world in information and communication technology development index (IDI). IDI index is a composite index that combines 11 indicators related (a) availability of ICT infrastructure and access, (b) a level of ICT usage, and (c) the capability to use ICTs effectively. Since ICT is the backbone of the modern media environment, Korean media environment provides users higher interactivity and connectedness. Figure 4 shows the IDI values for South Korea of 2016 and 2017.

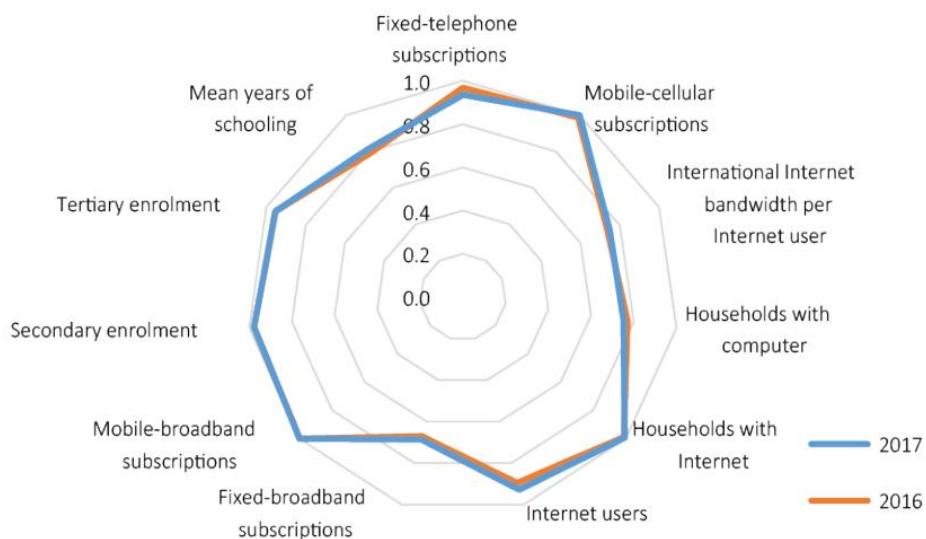


Figure 4 IDI values for South Korea (ITU, 2017)¹

In addition, Korea has a sophisticated mobile market and it leads deploying the latest technologies like LTE and 5G (International Telecommunication Union, 2018). There are three operators in Korean mobile market, SK Telecom, Korea Telecom, and LG U+. These operators not only provide mobile network service, but they also provide bundling service with Internet Protocol Television (IPTV) and internet. There is virtually nationwide LTE population coverage, and approximately 80 per cent of the country's mobile connections are through LTE. Korean consumers represent the most active group in terms of new media use with these ICT landscape (Woo, Choi, Shin & Lee, 2014).

In 2018, 87.6% of the Korean population used smartphones to access the Internet

¹ ITU (2017). Measuring the Information Society Report. Geneva: United Nations.

(International Telecommunication Union, 2018). Also, 48.2% of the population use social networking services (SNS), and it is continuously increasing after 2011(16.8%). The most frequently used SNS among SNS users was Facebook, with 34.0% being the highest, followed by Kakao Story, the domestic service with 27.0%. Kakao Story has been decreasing since 2013, and Instagram have been increasing since 2014 (0.4%), with 10.8% (Korea Information Society Development Institute, 2018).

In addition, Chang (2005) reviewed some Korean online media platform and characterized the characteristics of Korean public opinion formation media. Especially for the political participation, online media communities function as epicenters of activities that lead the movement for political reform for both conservatives and liberals. Various types of media are used for it (internet newspapers, online communities, and citizen journalist websites). So he argued that Korean cases show that online media functions communicative or participatory democracy.

Chapter 3. The Role of Media in User Participation in Knowledge Process: Focusing on the Online Space

3.1 Introduction

Advances in communication technology have transformed the knowledge processes that people use to acquire, generate, and disseminate knowledge. Although there are some studies based on the social cues-filtered-out model of computer mediated communication (CMC), which assert that this causes limited communication and lowers satisfaction compared to face-to-face interaction, online communities (OCs) are significantly contributing to “knowledge collaboration,” defined as the modification, accumulation, and recombining of knowledge (Faraj, Jarvenpaa & Majchrzak, 2011). Online communities are defined as open collectives of individuals achieving collective welfare by enhancing common interests (Sproull & Arriaga, 2007), which aids the manifestation of collective intelligence (Luo, Xia, Yoshida & Wang, 2009). At the same time, people who are included in an OC communicate, interact, and develop relationships through IT-supported virtual space (Lee et al. 2002), and this IT-supported space helps build stronger intelligence than offline organization (Luo et al., 2009). In addition, the absence of social characteristics (e.g., gender, age, social and professional status) and anonymity in the online space allows users to communicate more pleasantly and freely to other users.

These characteristics of OCs have a positive impact on achieving the various purposes of communication, as well as on equal and effective participation at computer mediated communications (Walther, 1992). In this context, related studies have provided empirical evidence that positive, socially rich, and relational behavior in the online community can enhance knowledge collaboration by enhancing social bonding (e.g., Walther, 1992; Tidwell & Walther, 2002; Utz, 2000).

However, not everyone involved in OCs provides equal contributions to the process of knowledge collaboration. Therefore, research has focused on the opinion leader (King & Summer, 1970), who is supposed to make a significant contribution to knowledge creation for the control of knowledge process in OCs. However, most of the studies emphasized internal aspects such as the condition, motivation, and satisfaction of the participants (Brandtzæg, 2010), and focused on “input-and-output” aspects such as systematic incentive policies, but they did not consider each participant’s trait in depth. The important point is that OCs depend heavily on the voluntary activities of the participants, and the OC’s characteristics are thus determined by the behavioral characteristics of the participants. From an organizational point of view, identifying individual characteristics of OC members is essential to improve organizational competence and organizational managers should propose optimal strategies based on their organizational characteristics.

In order to confirm the behavioral characteristics according to roles, this study classified the members participating in online space into three major categories. The first

group of users is a “active participants” that produces new knowledge through the same method of documenting knowledge and organizing the community. However, this creative group accounts for a low percentage of all users. In reality, most users fall within a “passive participant” group, where the participants slightly add, modify, and recombine knowledge; or a group of “bystander” where participants only consume existing knowledge. Using data from the Korea Information Society Development Institute’s (KISDI) annual media panel survey, this study classified the survey respondents into groups according to the degree of knowledge activity (knowledge creation or sharing) in online space. Based on the results of this classification, behavioral patterns affecting knowledge activities are derived by identifying patterns of media use behavior in each group. The results of the analysis suggest that the pattern of media use behavior varies according to the form of knowledge activity in OCs. Based on the results, this study suggest the optimal strategy of using the media environment to activate users’ participation in knowledge process.

Knowledge production (creation) depends on diverse factors (Jung, Lee & Workman, 2018). The diversity of devices in the modern media environment, the unlimited media connectivity, and the abundant sources of information have enabled OCs to interact with other media. In particular, media plays a key role in the production, sharing, and consumption of modern social information and is involved in knowledge processes and needs to be considered. My findings can be considered as a source of important value not only from the OC’s own perspective, but also from an enterprise level (Ma & Agarwal,

2007). A close relationship exists between knowledge creation and the development of firm managers' competencies (Nikitina & Lapiña, 2019). For example, as knowledge has been a valuable asset of firms (Han, 2017), public knowledge formed by OCs is used as a source for organizational innovation (O'Mahony & Ferraro, 2007; Tapscott & Williams, 2006; von Krogh & von Hippel, 2006). Word of mouth (WOM) on OCs and SNS is used as a core competency in the marketing aspect of a company (Park, Sung & Im, 2017), and software vendors provide platforms to attract users to their innovation environment (Baek, Kim, & Altmann, 2014; Kim, Altmann & Kim, 2019). Therefore, research on knowledge in online communities is very important for companies in terms of knowledge assets and marketing as well as the states for promoting innovation and collective intelligence.

3.2 Literature Review

3.2.1 Knowledge Collaboration in Online Space

Development of online platforms has been expected to not only generate an unprecedented evolution of organizational knowledge (Lykourentzou, Vergados, Kapetanios & Loumos, 2011) but also provide an effective solution for social problems (Luo, Xia, Yoshida, & Wang, 2009). Therefore, a number of studies have tried to discover ways of how to use online space for knowledge collaboration. The studies of knowledge collaboration in online space can be divided into two streams: motivation of participation and system dynamics.

Individual motivation is the key driving force of an online community, because there

are few incentives for their participation. Based on Maslow's (1943) hierarchy of needs theory, Grosso (2001) argued that individual needs may be satisfied during participation in online communication. Similarly, Bishop (2002) suggested that online communities basically provide users with "deficit needs" and that "higher being needs" could be met. These studies explain the motivation for behaviors in the online space such as knowledge sharing, production, and modification (Bishop, 2007). In addition, a strong and consistent incentive system could also motivate participation in knowledge collaboration in the online space. Hall (2011) classified the incentive as "hard (explicit) rewards" and "soft rewards." A hard (explicit) reward is an economic reward, learning opportunities, and career advancement, while soft rewards enhance reputations and personal satisfaction. Besides either psychological aspects or incentive systems, the organizational ownership of their information and expertise and the strong belief toward incentives also becomes a source of knowledge sharing in the group (Jarvenpaa & Staples, 2001). In sum, both individual needs and external incentives can be the catalysts for knowledge collaboration in an online community (Bock & Kim, 2002).

System dynamics has been emphasized in collective intelligence studies which deal with collaborative behaviors solving complex social problems or creating knowledge. Especially, the online space has been considered an essential factor for collective intelligence (Mačiulienė & Skaržauskienė, 2016). Skaržauskienė, Mačiulienė & Pitrėnaitė-Žilėnienė (2013) presented three dimensions: capacity, emergence, and society, to evaluate the potential of the collective intelligence of an online community. First,

capacity is highly relevant to the quality of an organization. The capacity dimension refers to characteristics which are a source of successful knowledge creation, such as diversity (Page, 2007), knowledge inflow (Luo et al., 2009), openness (Lykourentzou et al., 2011), knowledge integration (Lesser, Shah & Pulver, 2012), and accumulation and exploitation of internal knowledge (Goyal & Akhilesh, 2007; Yu, Nickerson & Sakamoto, 2012). Second, the emergence dimension includes trust (Erdem, 2003), transparency (Prahalad & Ramaswamy, 2004), and self-organization based on an equal relationship (Schut, 2010). This dimension is related to the synergetic interactions or adaptability within a fluctuant environment. Lastly, the social dimension refers to social maturity such as culture and values (Boder, 2006). In this dimension, social maturity is known to determine the quality of organizational goals and potential scope of development (Mačiulienė & Skaržauskienė, 2016).

3.3 Analysis

3.3.1 Data and variables

This research was based on media panel data provided by the Korea Information Society Development Institute (KISDI). The media panel data was gathered by asking various questions related to the users' media utilization for the same survey group, for every year. Media panel data has been used for diverse media researches like the effect of social media on political polarization (Lee, Shin & Hong, 2018), relationship between screen time and physical activity (Shin, 2018), and the effect of television content (Kim, 2019). In this study, respondents' demographics, media device utilization time, media utilization time, and activities in online space were used, in as items of the 2018 data. In the data, respondents could be selected from household or individual units. However, since our research model requires the characteristics of individual users, we excluded household response data and only used the survey data of 9,426 individual respondents.

Further, in the data, demographic information was assigned to one questionnaire, but media device usage, media activity (content usage), and knowledge activity in online space contained multiple responses. In detail, the device usage pattern consists of 42 items while the media content usage item has 40 items. The data tracked respondents' daily usage time for 42 devices and media activity for three days to provide daily media

usage time. This study set the cumulative device usage time (USE_i^k) and cumulative content usage time (ACT_i^k) as variables. Of these, all respondents whose average usage time was less than 0.1 hour were excluded from devices and activities.

In this study, contribution to knowledge activities in online space is derived from the combination of three levels of knowledge: provision, modification, and consumption. The provision of knowledge includes behaviors such as writing documents and responding to questions. Transformation of knowledge represent writing comments and evaluations of existing content, and finally, consumption of knowledge is represented by sharing, scrapping, and reading. Each item was constructed based on the media usage behavior data provided by the media panel. This study defined the Euclidean distance based on each axis of knowledge activity as the degree of contribution to knowledge creation ($CONT_i$). However, there were differences in the number of questions for each axis, so the sum of the scores was divided by the number of questions.

$$ED_i = \sqrt[3]{\left(\frac{know_{provide}}{N_{pro}}\right)^2 + \left(\frac{know_{modify}}{N_{mod}}\right)^2 + \left(\frac{know_{consume}}{N_{con}}\right)^2} \quad \dots \dots \dots \text{Eq. (1)}$$

Table 1 Basic statistics of variables

Variable	Average	Std. dev.	Skewness
Observations = 9,426			

Device usage time (USE_i^k)	6.30	17.39	3.87
Media activity time (ACT_i^k)	3.51	11.66	5.61
Contribution to knowledge creation ($CONT_i$).	2.18	0.90	3.08

3.3.2 Clustering

In the research model, this study divided users into three groups according to contribution to knowledge creation. Data classification was performed using the k-means algorithm, a machine learning methodology that minimizes the distance of the cluster. The k-means algorithm is a type of data partitioning method that divides data into several partitions. Basically, k-means uses the Euclidean distance between the data in the cluster as a cost function. By using the distance cost function, a classification criterion that minimizes the cost function is sought (Drineas, Frieze, Kannan, Vempala & Vinay, 1999).

Past studies have divided groups by the average or median value of some criteria, which is seen a little artificial. However, k-means clustering algorithm divides groups without specific basis of partitioning, in this study, the level of users' participation in knowledge activities that we don't know which value means active or passive. Also, in this study, users' participation in knowledge activity is examined by three categories: knowledge production, knowledge modification, and knowledge consumption. We cannot judge a person who produce 3 level of production and 7 level of modification is more actively participate on knowledge activity than a person who produce 4 level of production, 4 level of modification, and 3 level of consumption.

For those reasons – complexity in the variable, and securing justification of the

partitioning basis - k-means clustering algorithm is used to classify the Korean population by their level of participation in knowledge activity. With similar reasons, there are some studies that classified unspecific users with k-means algorithm (Gao & Feng, 2016; Maia, Almeida & Almeida, 2008; Kathuria, Jansen, Hafernik & Spink, 2010). Since the number of clusters increases the complexity of the optimization model, it should be fixed before the operation. The procedure of k-means is as Figure 5 (Jain & Dubes, 1988).

$$\arg \min J(c_k) = \sum_{k=1}^n \sum_{x_i \in c_k} (x_i - \mu_k)^2 \quad \dots \dots \dots \text{Eq. (2)}$$

c_k : dataset of cluster k

x_i : a data in cluster k

μ_k : center of mass of cluster k

n : number of cluster

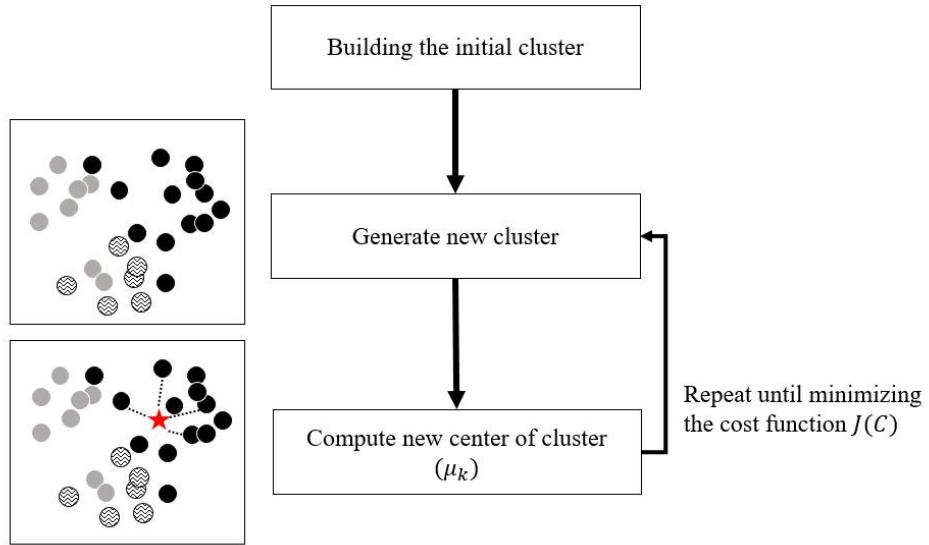


Figure 5 Basic steps of k -means algorithm

However, since the k -means algorithm is a kind of unsupervised learning, it does not provide a basis for labeling each cluster. In addition, there is the possibility of converging to the local optimum in the process of minimizing the cost function of the algorithm, and this convergence point changes according to the selection of the initial value. In other words, k -means is a method for finding local minima rather than global minima (Jain, 2010). In order to solve this problem, the initial center of gravity is assigned to the three densest points on the data to prevent inaccurate convergence of the algorithm.

This study classified the research data into three groups through the k -means algorithm and labeled each cluster based on the media usage behavior characteristics of the classified group. The first group is the “bystander” group represented in purple in

Figure 6. The “bystander” group is a relatively passive group in all knowledge activities. The second group is the “passive participants” group. This group is not too different from the “bystander” group in terms of providing knowledge, but it shows relatively high activity in terms of knowledge modification and knowledge consumption. This group is represented by the green bubble in Figure 5. The last group is the “active participants” group. This group showed relatively higher activity in terms of knowledge providing activities than other groups. At the same time, they are contributing on knowledge consumption and knowledge modification at higher levels than other groups. Therefore, the “active participants” group can be regarded as an important group in the online knowledge process.

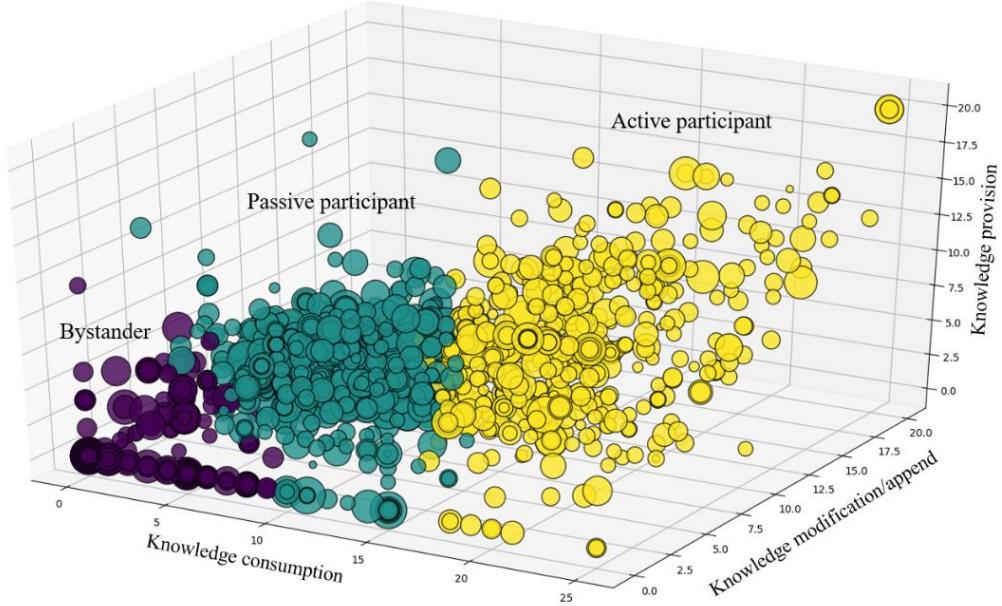


Figure 6 The result of k -means clustering of the users

3.3.3 Research model

3.3.3.1 Research model 1: type of users

Two analyses were conducted to understand the relationship between users' media utilization patterns and their contribution to knowledge creation in online space. First, this study adopted an ordered probit model to confirm the influence of user's pattern on the level of participation in the online knowledge process. Ordinary methods such as a Likert scale were used to investigate human attitudes. The ordered probit model was used in the estimation model with the ordinal score as a dependent variable. The core of the theoretical concept of the ordered probit model is a way to define the scale of dependent variables. The ordered probit model has been used in various fields, for example, management studies such as migrants of firms (Van Dijk & Pellenbarg, 2000), type of

client of SMEs (Robson & Bennett, 2000), or transportation studies on driver injury (Kockelman & Kweon, 2002; Srinivasan, 2007). This type of study has the common feature of the dependent variable. Different to ordinary logit models, the ordered probit model uses multiple logical numbers which represent a certain degree and those numbers should be sorted by arithmetic sequence (Greene, 2004).

In a data set containing n respondents, when the ordinal score of the respondents with the index i is y_i , the potential score y_i^* estimated based on the response tendency prior to that can be found. At this point, y_i^* can be assumed to have a linear relationship with the independent variable vector (Daykin & Moffatt, 2002).

$$y_i^* = x_i' \beta + u_i \quad i = 1, \dots, n \quad \dots \dots \dots \text{Eq. (3)}$$

$$u_i \sim N(0,1)$$

When the items consist of J scales, the dependent variable is defined as a set of positive integers between 1 and J. The probability density function of y_i^* can be divided into the J intervals based on K_j ($j=1, \dots, J-1$) known as the “critical parameter” (Daykin & Moffatt, 2002). Since the critical parameter K_j is a free parameter, the likelihood function of $P_i(y)$ should be estimated.

$$P_i(y) = P(\kappa_{y-1} < y_i^* < \kappa_y) \quad \dots \dots \dots \text{Eq. (4)}$$

$$= \Phi(\kappa_y - x_i' \beta) - \Phi(\kappa_{y-1} - x_i' \beta)$$

$(\phi = \text{standard normal cumulative distribution function})$

In the ordered probit model of this study, three-step ordinal scales were used as a dependent variable according to the level of knowledge participation. In this scale, 1 represents the most passive participation in the knowledge process in online space, and 3 represents the most active participation. Independent variables include both demographic information and individual media usage patterns. The individual media pattern consists of a linear combination of the time (USE^k) to use the device k and the time (ACT^l) to be put into media activity l . As mentioned earlier, this study excluded items with very low average usage time, and finally reduced the number of types of devices (k) used to 9 and the number of activities (l) to 17. Therefore, the regression model used in this study is as follows:

$y(\text{Degree of participation})$

$$= \sum_{k=1}^9 \beta_k^{use} USE^k + \sum_{l=1}^{16} \beta_l^{act} ACT^l + DEMO \cdot \beta^{demo} \quad \dots \dots \dots \text{Eq. (5)}$$

In this study, media devices/media and activity were divided into traditional media and new media according to the level of users' participation. The traditional media devices/medium include newspapers/books/magazines, televisions, radios, telephones, and mobile phones, and the new media devices/medium includes smartphones, computers.

Table 2 shows the descriptive statistics of variables used in this study.

Table 2 Descript statistics of the variables used in this study (N=9,426)

Variables	(%)	Min	Max	
Individual characteristics				
Gender (Male/Female)	45.6 / 54.4			
Age (under 20/20-30/30-40/40-50/50-60/upper 60)	13.0/10.8/8.8/18.9/18.7/29.8			
Education				
(under High school/High school/College or above/others)	29.6/33.5/35.0/1.9			
Income (Unit in 10,000 KRW) (No income/1–199/200–399/400–500+)	40.5/34.1/21.5/4.0			
Knowledge generating groups				
Active participants / Passive participants / Bystander	4.2/18.4/77.5			
Independent variables	Mean	Std. Dev.	Min	Max
<i>Media devices usage time (Unit in 15 min)</i>				
Newspapers/books/magazines	7.73	21.58	0	216
Traditional media devices	2.20	7.77	0	184
Radio	43.15	30.13	0	194
Television	1.16	3.30	0	88
Telephone	1.11	3.71	0	49
Mobile phone				

	Smartphone & wearable device	20.24	19.22	0	216
New media devices	PC (desktop)	8.71	19.48	0	240
	PC (laptop)	1.85	9.48	0	155
	PC (tablet)	0.29	3.34	0	121
<i>Media activities usage time (Unit in 15 min)</i>					
Traditional media activities	Watching terrestrial TV content	32.32	28.08	0	194
	Watching terrestrial TV content (VOD)	0.69	4.71	0	148
	Watching cable TV content	5.87	12.37	0	173
	Watching cable TV content (VOD)	0.16	1.91	0	75
	Listening to radio content	2.88	9.89	0	184
	Phone calls	8.63	7.71	0	128
	Text messages	0.93	3.47	0	194
	reading/writing/sending				
	Reading news (Newspaper, Internet news, etc.)	0.80	3.04	0	58
	Reading books	7.81	21.80	0	216

	(Printed books, e-book, etc.)				
	Reading magazines	5.07	8.09	0	160
	E-mail reading/writing/sending	0.16	1.83	0	106
	Instant Messenger	2.94	8.27	0	168
New media activities	reading/writing/sending				
	Browsing information content	2.90	6.38	0	114
	Using SNS & blog	0.72	3.40	0	72
	Watching UCC	0.17	1.87	0	55

According to Table 3, most of the media device usage had positive effect on the level of participation in knowledge activity except the usage of mobile phone. On the other hand, only smartphones and wearable devices had a positive effect on users' participation in knowledge activity among new media. However, users' media activities had different effect from the usage of media devices. Only 'Text messages reading/writing/sending' and 'E-mail reading/writing/sending' had positive significant effect on users' participation in knowledge activities.

Table 3 Result of ordered probit regression analysis

Variable	Coefficient	z	P > z
----------	-------------	---	--------

Media Devices

Traditional media devices	Newspapers/books/magazines	0.0042	3.49	***
	Radio	0.0172	5.58	***
	Television	0.0072	2.49	**
	Telephone	0.0056	0.65	0.517
	Mobile phone	-0.0759	-3.07	***
New media devices	Smartphone & wearable device	0.0161	5.57	***
	PC (desktop)	0.0039	0.51	0.613
	PC (laptop)	0.0001	0.04	0.971
	PC (tablet)	0.0024	0.58	0.563

Media Activity

Traditional media activities	Watching terrestrial TV content	-0.0112	-3.71	***
	Watching terrestrial TV content (VOD)	-0.0029	-0.44	0.657
	Watching cable TV content	-0.0101	-2.59	**
	Watching cable TV content (VOD)	-0.0042	-0.34	0.734
	Listening to radio content	-0.0035	-0.79	0.431
	Phone calls	-0.0022	-0.46	0.645
	Text messages	0.0493	6.6	***
	reading/writing/sending			

	Reading news			
	(Newspaper, Internet news, etc.)	-0.0107	-1.49	0.136
	Reading books	-0.0015	-0.13	0.900
	(Printed books, e-book, etc.)			
	Reading magazines	-0.0053	-1.2	0.229
New media activities	E-mail reading/writing/sending	0.0216	2.52	**
	Instant Messenger reading/writing/sending	0.0041	0.95	0.342
	Browsing information content	0.0026	0.63	0.526
	Using SNS & blog	-0.0037	-0.71	0.477
	Watching UCC	0.0054	0.64	0.522
<i>Demographics</i>				
Gender	0.0129	1.94	*	
Age	-0.0325	-14.02	***	
Education	0.6094	17.25	***	
Income	0.0362	3.1	***	

Notes: *Significant at the 10% level, **5% level, ***1% level

3.3.3.2 Research model 2: pattern of users

In the second regression model, this study confirmed the difference of users' media use patterns by the knowledge participation clusters. To investigate the differences in users' patterns, this research transformed the degree of knowledge process participation in the continuous variables. The transformation method to a continuous variable is the same as the method to measure the contribution of knowledge creation mentioned above. This transformed continuous variable was used as a dependent variable of the model.

$$ED_i = \sum_{k=1}^9 \beta_k^{use} USE^k + \sum_{k=1}^{16} \beta_k^{act} ACT^k + DEMO \cdot \beta^{demo} + \alpha \quad \dots \dots \dots \text{Eq. (6)}$$

Since this model has a dependent variable as a real number between 0 and 5, the coefficients of independent variables are estimated using the ordinary least squares (OLS) method. Table 3 is the result of OLS estimation by three groups that divided respondents according to their knowledge participation level. The independent variables used in this analysis are the same as the ordered probit model conducted before, but the dependent variables are Euclidian distance ED_i which is based on three knowledge activities: production, modification, and consumption. Since each axis of knowledge activity consists of real numbers between 0 and 5, ED_i can have a real number between 0 and 8.7.

The results of the analysis can be explained by dividing as "active participants" and other groups. First, "bystander" group and "passive participants" group showed similar pattern that their participation level in knowledge activity is affected by the media activities like "Watching TV content", "Text messages reading/writing/sending", "Reading magazines", and "E-mail reading/writing/sending." However, they showed different effect of "Watching TV content" that while bystander's participation in knowledge activities had negative impact by Watching TV content, but passive participants' participation in knowledge activities had positive impact by Watching TV content. In addition, while passive participants' participation level got positive impact by traditional media devices like newspapers/books/magazines and radio, bystander group only affected by newspapers/books/magazines. Also, the use of mobile phone and laptop negatively affected bystanders' participation level.

Second, the "active participant" group showed a clearly different pattern from the

previous two groups. Unlike these previous two groups, a tablet PC and smartphone were the only variables improving the degree of participation in the online knowledge activities. The most rational explanation for this pattern can be found from the characteristics of fast-changing information on the web through real-time interaction between users. In other words, the characteristics of high real-time, liquidity, and volatility of online space knowledge require a mobile smart device which is easily accessed regardless of time and space, so users in the “active participant” group are likely to prefer those devices.

Table 4 Result of OLS

Variable		Bystander	Passive participant	Active participant
<i>Media Devices</i>				
	Newspapers/books/magazines	0.0002*	0.0010**	0.0032
Traditional media devices	Radio	-0.0002	0.0055***	-0.0087
	Television	0.0002	-0.0022*	0.0016
	Telephone	0.0000	-0.0016	0.0046
	Mobile phone	-0.0010*	0.0008	0.0322
New media devices	Smartphone & wearable device	0.0000	0.0005	0.0120**
	PC (desktop)	0.0000	-0.0001	0.0035
	PC (laptop)	0.0006	-0.0004	0.0076

	PC (tablet)	-0.0017**	-0.0001	0.0344***
<i>Media Activity</i>				
	Watching terrestrial TV content	-0.0004**	0.0025**	0.0039
	Watching terrestrial TV content (VOD)	-0.0008*	0.0037	0.0030
	Watching cable TV content	-0.0005**	0.0028*	0.0030
	Watching cable TV content (VOD)	0.0012	0.0000	0.0003
Traditional media activities	Listening to radio content	0.0001	0.0004	0.0069
	Phone calls	0.0005	0.0025	-0.0184**
	Text messages	0.0024**	0.0051**	-0.0145
	reading/writing/sending			
	Reading news			
	(Newspaper, Internet news, etc.)	-0.0020**	0.0025	-0.0239
	Reading books			
	(Printed books, e-book, etc.)	-0.0022	-0.0061	-0.0101
	Reading magazines	0.0008**	0.0064***	-0.0120*
New media	E-mail reading/writing/sending	0.0024***	0.0087**	-0.0101

activities	Instant Messenger reading/writing/sending	0.0004	0.0023	-0.0093
	Browsing information content	0.0006*	0.0001	-0.0044
	Using SNS & blog	-0.0002	0.0009	-0.0109
	Watching UCC	0.0000	0.0013	0.0168
<i>Demographics</i>				
Gender		-0.0004	-0.0106	0.1138
Age		-0.0006***	0.0010	0.0053
Education		0.0169***	0.0162	-0.1782*
Income		0.0008	-0.0065	0.0043

Notes: *Significant at the 10% level, **5% level, ***1% level

3.3.4 Summary

In the section 3.3.2, this study categorized Korean population into three groups according to their level of participation in knowledge process among online space. Because of the complexity of participation variables and absence of participating basis, K-means clustering algorithm was used to categorize them. Each Groups were named as “active participants”, “passive participants”, and “bystanders.” This category can be used to examine people’s participation activities in knowledge process.

Based on the category which was derived, this study aimed to examine each groups’

media usage pattern and tried to find the relationship between media usage and users' participation in knowledge activities. This study was conducted from two perspectives to identify user patterns that promote knowledge processes occurring in the online space. The first analysis aims to identify variables that affect the possibility of belonging to the "active participants" group. In the present study, it is classified that the user group into three groups based on three axes: knowledge consumption, knowledge modification, and knowledge production. Based on this classification of users, the study adopted an ordered probit model that uses the users' affiliation as a dependent variable to confirm the possibility of active users with which characteristics.

Through analysis of the results, it was obtained that the two main findings. First, the use of traditional media devices increases the possibility of becoming an active user. In fact, to participate in the knowledge process, background knowledge related to the contents is required. For this, external channels that can acquire related knowledge and information are required for users. Therefore, users use the traditional media devices as a way to acquire background knowledge to participate in the online knowledge process. However, in terms of media activities, it was found that media activities with traditional media lower the possibility of becoming active users. Although use of the traditional media devices is an efficient method to acquire the background knowledge and information, the limited activities during using traditional media may result in isolating the knowledge and information possessed by each user. The results of this study also show that the variables of interactive communication increase the possibility of active

user group membership. These results mean that interaction with other users is essential for users to belong to active participant groups.

The second purpose of this study was to find the characteristics of media devices and utilization of users that affect the degree of contribution to online knowledge activities. This study used the OLS model, which uses the degree of participation of each user in the online knowledge process as a dependent variable. The results of the analysis were independently represented in three groups: “bystander,” “passive participant,” and “active participant.”

The unique feature of the “bystander” group is that the use of mobile smart devices hinders participation in online knowledge processes. This contradictory result could be caused by the difference in the purpose of use of the device. In other words, users in this group have the purpose of using smart devices in other aspects rather than participation in knowledge processes, for example, music appreciation, watching videos, and playing games. Since the difference in the purpose of use implies that the use of smart devices becomes the opportunity cost of participating in knowledge processes, as a result, the degree of participation in knowledge processes is lowered.

The group of “active participants” showed a clear usage pattern. In this group, the use of mobile smart devices was the only variable to increase the level of knowledge process participation. As mentioned above, knowledge and information in online space have characteristics of real-time, high liquidity and volatility. Hence, users should adopt a channel which satisfies these characteristics to actively participate in the knowledge

process. Although the quality of participation of users could not be evaluated in this study, it is a rational conclusion that the usage time of mobile smart devices is a key determinant of knowledge process participation within the “active participant” group.

Since the “passive participant” group is located between the two extreme groups, it tends to share some of the characteristics of each. Therefore, in this group, various variables have a positive effect on knowledge participation activities regardless of the type of media devices and activities. For example, newspapers/books/magazines, radio, watching TV, magazine reading, text messages, and e-mails belong to them. However, the time spent on new media devices was not related to their participation, as opposed to the active participants. Although the “passive participant” group participates in the online knowledge process, the level of participation is lower than the “active participant” group. So it is highly likely that the “passive participant” group is not sensitive to the characteristics of knowledge in the online community. Consequently, the use of mobile smart devices can be considered as a unique effort to create new knowledge in the “active participant” group.

Base on the previous results, the hypothesis I built in the Chapter 1 could be examined. The ordered probit model showed that the media usage affects users’ participation level, in terms of it increases the probability of users being ‘active participants.’ Especially, the usage of traditional media increased the possibility of becoming an active user. Also, the OLS model showed that each knowledge producing groups affected by different media usage. The new media, smart devices had different roles depending on the users’

knowledge activity traits that while it hinders bystanders' participation in knowledge activity, it increases the participating level of active participants. Thus, Hypothesis 1 is accepted.

Hypothesis A: Media use affect users' participation, depending on media communication method & whether it is new media (Accepted).

3.4 Discussion

The results of this study emphasize two determinants to create or combine knowledge in the online space. The first determinant is an acquisition of information. The acquisition of knowledge can be accomplished by various channels such as TV, radio, books, Internet, etc. However, since each person has their own personality and context, not all types of media can be the source of knowledge (Sun & Cheng, 2007; Chen & Chang, 2018). Although the utilization of various channels can bring richness of information (Daft & Lengel, 1986), users are likely to maintain the use of certain media because of the individual characteristics mentioned above. The results of the ordered probit model show that traditional media are likely to be used as a method for information inflow. Also, text messages and e-mail were found to be factors which increase the participation of users.

They are also traditional media in the bidirectional communication method. Actually, this tendency has been discussed before in the name of the “path dependency” or “lock-in” effect, both of which belong to the dynamic framework. Path dependency was developed to distinguish feedback economics from conventional economics (Liebowitz & Margolis, 1995). It is, therefore, rational that users who have depended on a certain media are likely to choose the media which they have continuously used before. That is why users prefer traditional media devices and activities to those on the cutting edge. In sum, acquiring new information and knowledge is an important issue for participation in online knowledge activities. Thus, when they want to collect information from external sources, users select several methods perceived to be familiar.

The second determinant for stimulating online knowledge activity refers to the accessibility of the online space. As mentioned above, each media has its own role in the knowledge creation process. For example, traditional media such as TV, radio, e-mail, and text messages are an effective way to gather background knowledge. Naturally, users should consider how to share the accumulated information and knowledge with other users in the online community. Accessibility is relevant not only to these sharing activities but is also another channel to acquire additional information and knowledge. The second analysis conducted by the group classified by the degree of participation provided some meaningful results about accessibility. According to my definition, the active participant group is an important user group for knowledge process in the online community. Contrary to this group, the bystander and passive participant groups merely consume or

modify existing knowledge. In other words, except for the active participants, the groups focused on the exploitation of the existing information and knowledge and thus are not involved in knowledge creation.

The OLS estimation results of these two groups show clear evidence for this. In both the bystander and passive participant groups, high accessibility of device and activities did not increase the level of users' participation. Especially the bystander group, which merely consumes existing information and knowledge, does not request information inflow through traditional media and activities such as TV, radio, newspaper, text message, or e-mail. This means that the bystander group hardly collects new information and knowledge from the outside. Different from the bystanders, the passive participant group is likely to gather external information by traditional channels. As shown in Table 4, the use of traditional media and activities significantly increased participation in knowledge activities in the online space. On the other hand, highly accessible media and activities such as smartphones, tablet PCs, SNS, etc. are not included in the set of determinants enhancing their participation, so it can be concluded that the passive participant group focuses on utilization of existing knowledge.

However, users in the active participant group were found to prefer high accessibility rather than familiar mediators. The results of OLS analysis show that the tablet PC and smartphone (smart device) were the only determinants of an increase in the level of participation. Smart devices have been known as an effective way to expand human capabilities (Smith, Spence & Rashid, 2011) because information and knowledge is a key

input of developmental activities (Benkler, 2006). Adding to the enhancement of individual capabilities, it is easy to react to a fast pace of knowledge process when there is the high accessibility of an online community. Especially, if accessibility reaches a certain threshold, online communication becomes similar to face-to-face communication. So, under high accessibility, the active participant group can apply the knowledge and information they possess to current issues emerging in the online space. Furthermore, it can be guessed that the active participant group is likely to utilize “smart device” as a source of external information and knowledge. In sum, active users have been using smart devices for both inflow and outflow channels of their knowledge and information.

Based on the conclusions discussed above, this study provides empirical evidence of the criticism about uniformly implemented strategies for using collective intelligence in the virtual space. It is hard to transform a bystander into an active participant, because people instinctively resist change in their behavior. Therefore, an effective strategy for the active participant group may be useless for the bystander group. This means that a different strategy is requested by which the knowledge group is forming a greater part on the community or organization. In this context, this research can give appropriate guidelines to establish strategies for enhancing users' participation in knowledge activity for online communities which need to construct collective intelligence like Wikis and GitHub. Those who are not interested in knowledge activity at all, for example, the bystander group, will first construct background knowledge or accumulate external information. When users participate in a part of the entire knowledge process despite

considerable information and knowledge, the solution can become a matter of accessibility to the online space. By enhancing accessibility through the use of a smart device or SNS activity, passive participants can move to the active participant group. After all, most of the strategies that have been suggested by a number of previous studies are likely to fit for the active participant group. For example, open online platform (Ahn & Lee, 2009), creative evolutionary system (CES, Lee & Chang, 2010), flexibility of online community (Faraj, Jarvenpaa & Majchrzak, 2011), diversity (Woolley, Aggarwal & Malone, 2015), cognitive architecture (Kolonin, Vityaev & Orlov, 2016), solution sharing method (Reia, Amado & Fontanari, 2019) are all solutions which have been presented for knowledge collaboration or emerging collective intelligence.

3.5 Implications and limitations

The diversity of devices in the modern media environment, the endless media connectivity, and overflowing information sources have made the online community interact with existing media. Especially, media plays a key role in the production, sharing, and consumption of social information and knowledge. Therefore, it is necessary to discuss the knowledge process in the online community from a bottom-up perspective. The results can contribute to not only the knowledge process in virtual space but also that of the corporate level (Ma & Agarwal, 2007). For example, knowledge from online communities may be utilized as a source for organizational innovation (O'Mahony & Ferraro, 2007; Tapscott & Williams, 2006; von Krogh & von Hippel, 2006), and the diffusion power of an online community also provides a core competency in terms of

marketing by companies.

In the knowledge era, understanding knowledge input, output, and the process of production of knowledge is an important issue. The development of information and communication technology has accelerated the creation of knowledge-based societies and the role of the knowledge forum is becoming more important (Carrillo, 2015). Knowledge collaboration has been a critical element of the online communities' sustainability as users share and modify their knowledge in ways that contributing to the community's greater worth (Faraj, Jarvenpaa & Majchrzak, 2011; Murray & O'Mahony, 2007). For example, knowledge collaboration in the online community is also actively used to promote elections, policies, and campaigns (Tugrul & Lee, 2018). Moreover, companies look for new opportunities for innovation in online forums formed by users and utilize them as an effective marketing tool (O'Mahony & Ferraro, 2007; Tapscott & Williams, 2006; von Krogh & von Hippel, 2006; Park, Sung & Im, 2017). According to the results of the analysis, both the traditional media and new media devices and activities may contribute to the knowledge collaboration in the online space. Ultimately, those individual traits will take a major role in the creation of collective intelligence.

Since the knowledge collaboration in various online spaces is created by individual activities, this study focused on the impact of the individual traits related to media involving their use of device and behavior. In the past, many studies have investigated the requirements, definitions, and motivations of users toward the adoption of media, while few studies have dealt with the actual usage pattern of media (Brandtzæg, 2010). This

study offers contributions on two aspects. First, this study divided the users into three groups based on the degree to which they participate in the knowledge process of online space.

Also, this study has practical implications, especially for service firms which need to stimulate customers' knowledge collaboration. Online service brands such as Wikipedia or GitHub, the Open Source Software Community, should stimulate users to produce more knowledge on the platform and other users can be flow into the community. According to the results, service firms should investigate each user's knowledge activity characteristics first, and then take action to stimulate users' knowledge activity. The strategies for stimulating users' knowledge activity (marketing, advertising, and the provision of information sources, etc.) can be adjusted depending on users' distribution of knowledge activity. Some studies about service firms' strategies using media have been undertaken, but they only focused on one media (Mills & Plangger, 2015; Sorensen & Drennan, 2017).

It is both a strength and a limitation that this study does not specify a type of online community. Therefore, it may be useful to examine a specific online community which has a unique goal in further studies.

Chapter 4. The Effect of Communication

Methods on Users' Behavioral Changes in New media: Relationship between Game and Game-related content

4.1 Introduction

In game industry, there have been diverse user-generated contents (UGC) relating game information. Especially, in UGC live streaming services, represented as YouTube or TwitchTV, millions of individuals participate in this content format which provides both video formed information and interaction among users (Hamilton, Garretson & Kerne, 2014). In addition, live streaming services enable communication between game players and viewers who watch gameplay in real time. This type of service, represented by TwitchTV, has enabled the popularization of games and diversification of game content. TwitchTV is mainly concentrated on the gaming industry (Ewalt, 2014) and there were already 45 million unique users in 2014 (Zhao, Hu, Hong, & Westland, 2019) with 15 million unique daily visitors (Twitch, 2017). The market of game industry, including game casting and video game competition (e-sports), has been boosted by the rise of live streaming services like TwitchTV (Pires & Simon, 2015).

Such real-time streaming services are typical masspersonal communication media (O'Sullivan & Carr, 2017), in which the streamer (information sender) provides

information in the form of a broadcast for mass communication, and user (information receiver) interactions occur in the form of interpersonal communication (chatting). Therefore, users can obtain game-related information from three types of game-related media: traditional mass media such as television or radio, interpersonal communication media such as online communities, and masspersonal communication media such as real-time streaming services.

However, there are lack of researches that saw the effect of diverse format of game information content on users simultaneously. There were studies that saw only the effect of in-game communication (Shen & Williams, 2011; Williams, 2006; Chuang, 2006; Ducheneaut & Moore, 2004), Online communities (Hsiao & Chiou, 2012; Hsu & Lu, 2007), and live streaming services (Sjöblom, Törhönen, Hamari & Macey, 2017) on users, and the studies that examined the factors affecting users' loyalty or satisfaction toward online games (Yang, Wu & Wang, 2009; Lu & Wang, 2008). Considering multiple media effect is important in contemporary media environment (Brasel & Gips, 2011). This study connects the dots in the past studies that saw each media effect on users in game industry, with considering multiple media effect simultaneously.

In this study, it is also verified that factors affecting media usage differ according to type of communication, as proposed by O'Sullivan and Carr (2017). In gaming industry, video games have been studied from the perspectives of mass communication in the form of mediated communication such as radio, film, and television. However, interpersonal communication dynamics have also been considered in video game studies, because

video game experiences are shared by users with acquaintances, and interactivity is enabled by online games (Lucas & Sherry, 2004). Further, it is also considered that the content form of masspersonal communication, which is rising fast and accelerates the growth of the gaming market.

To examine the multiple media (game-related media) effect on users, this study examines the usefulness (informativity), enjoyment, and richness on of game-related media. Uses and gratification theory and media richness theory are used to build the research framework. In addition, relationships between game-related media and game are constructed with users' attitudes and intention to use toward both game-related media and games by Structural Equation Modelling (SEM) technique. In addition, it is constructed that an integrated model of game-related media and games to assess the relationships between them. Using these tools, this study examines the complementary relationships between media by observing how user attitudes about game-related media affect user intentions to play a game, and conversely, how user attitudes about games affect user intentions to use game-related media.

In the last section of this study, multiple group analysis is conducted to confirm the relationship between games and game-related media, and game-related media usefulness, enjoyment, and richness depending on the type of communication.

4.2 Research Framework and Hypothesis

4.2.1 Uses and Gratification Theory (UGT)

Uses and gratification theory (UGT) is one the oldest theories in media studies, specifically communication studies (Berelson, 1949; Herzog, 1944). UGT explains why people are motivated to use media, and what needs are satisfied by using media (Katz, 1959). Unlike other media theories, UGT proposes that each medium has only a limited effect, and that media do not select the user but the user selects media to satisfy their own specific needs (Katz, Blumler, & Gurevitch, 1974; Ruggiero, 2000; Abercrombie & Longhurst, 2007; Baran & Davis, 2006; Wang, Fink, & Cai, 2008). According to Rubin (1983), based on UGT, use of media can be conceptualized as either “ritualized viewing” and “instrumental viewing”. Ritualized viewing such as sending time, relaxation, or habitual use are “associated with diffuse motives,” and are a “less intention and nonselective orientation, a time filling activity” (Rubin & Perse 1987, p. 59). On the other hand, instrumental viewing indicates an individual's use of media in an intentional and purposeful way for meeting his or her desires. Therefore, motivations such as habits, relaxation, and entertainment are ritualized viewing, while motivations such as information seeking are instrumental viewing. Studies related to UGT have extended in scope beyond traditional media such as television, newspapers, and radio to new media such as the Internet and mobile devices. In particular, UGT has been applied to various communication types including television, seen as the typical mass communication

medium (Greene & Kremar, 2005; Schmitt, Woolf, & Anderson 2003), interpersonal communications (Ishii 2006), and multitasking using both communication types (Wang & Tchernev 2012). The uses and gratifications paradigm in communication studies provides a fresh theoretical approach for new communication media research (Ruggiero, 2000). Therefore, UGT has been applied not only to studies of information media, but also of new media like online games (Sherry, Lucas, Greenberg, & Lachlan, 2006; Wu, Wang, & Tsai, 2010). In addition, studies analyzing user motivations for using new media including the Internet conclude that the basic motives underlying the use of new media are not different from those of traditional media. Specifically, usefulness (informativity) and enjoyment are considered to be the most important motives for using media services (Choi, Jung, & Lee, 2013; Kim, Sohn, & Choi, 2011; Leung, 2013; Raacke & Bonds-Raacke, 2008). Therefore, based on existing studies on UGT, this study formulated the following test hypotheses for the present study.

H1: The usefulness of a medium that provides information about a game (game-related media) will have a positive impact on a user's attitude toward the game.

H2: The usefulness of a medium that provides information about a game (game-related media) will have a positive impact on a user's attitude toward the game-related media.

H3: The enjoyment of a medium that provides information about a game (game-related media) will have a positive impact on a user's attitude toward the game.

H4: The enjoyment of a medium that provides information about a game (game-related media) will have a positive impact on a user's attitude toward the game-related media.

4.2.2 Media Richness Theory

Daft and Lengel (1983) argue that media richness is determined by the ways media transmit information and the level of feedback that users experience when they use media, and also that different media have different levels of richness. According to Daft and Lengel (1986), 1) immediate feedback, 2) diverse clues, 3) diverse languages (including social and nonverbal contexts), and 4) personalization level affect media richness, and media that have those factors in abundance are “rich media.” In recent years, many studies have found that the richness of media applied via the Internet affect user attitudes and satisfaction toward media (Sun & Cheng 2007; Lu, Kim, Dou, & Kumar, 2014; Chen & Chang 2018). Based on media richness theory, this study formulated the following test hypotheses for the present study.

H5: The richness of a medium that provides information about a game (game-related media) will have a positive impact on a user's attitude toward the game.

H6: The media richness of a medium that provides information about a game (game-related media) will have a positive impact on a user's attitude toward the game-related media.

4.2.3 A model for interaction between games and game-related media

The purpose of this study is to empirically analyze how users' attitudes toward a game and users' attitudes toward game-related media affect the intention to use either. The main methodology used to study user acceptance of the information medium and game is structural equation modeling (SEM). SEM is widely used in research exploring innovation and new service acceptance. SEM can verify relationships between multiple variables in a single model, and can be grasped at a glance. Also, SEM is useful when testing and estimating the causal relationships between theoretical causal assumptions and determinants of users' values (Haile & Altmann, 2016).

Among SEMs, the Technology Acceptance Model (TAM) is based on the Theory of Reasoned Action (TRA). According to TRA, an individual's beliefs (subjective probability of the outcome of a specific behavior) affect the individual's attitudes (positive and negative emotions of an individual regarding a specific behavior) and leads to behavioral intention (BI) (Hsu & Lu, 2004). In a model proposed by Davis (1989), TRA's Belief-Attitude-Intention-Behavior chain is applied to user acceptance of information technology (IT). Furthermore, Davis, Bagozzi, and Warshaw (1989) found that a user's attitude toward a system affects perceived usefulness ("the degree to which

an individual believes that his/her performance will improve when using the system").

Later, the basic structure TAM was applied in a variety of contexts in IT (Igbaria, Parasuraman, & Baroudi, 1996; Gefen & Straub 1997; Chau & Hu 2002).

In this study, it is also applied that TRA to analyze user attitudes toward and intentions to use (IU) game-related media and games. In addition, indirect effects between latent variables were determined to reflect joint effects between media emphasized by Stephen and Galak (2010). In other words, this study assessed whether cross-effects upon user attitudes toward game-related media (games) affect IU a game (game-related media). Such indirect effects were addressed in mediation studies of mass communication (Holbert & Stephenson, 2003) and have been used to identify the effects of other media on a particular medium, such as that of television news upon newspapers (Holbert, 2005). Therefore, it is hypothesized that there are indirect effects between latent variables, user attitudes, and IU game-related media, and user attitudes and IU games.

H7: A user's attitude toward a game will have a positive effect on the user's intention to use the game.

H8: A user's attitude toward a game will have a positive effect on the user's intention to use game-related media.

H9: A user's attitude toward game-related media will have a positive effect on the user's intention to use the game.

H10: A user's attitude toward game-related media will have a positive effect on the

user's intention to use game-related media.

In addition, as described in the Introduction, this study defined the communication type of game-related media (mass communication, interpersonal communication, and masspersonal communication) as the mediation variable in order to determine the effects of communication types that are used by different game-related media.

H11: The effect of game-related media usefulness (informativity) will vary depending on the communication type.

H12: The effect of game-related media enjoyment will vary depending on the communication type.

H13: The effect of game-related media richness will vary depending on the communication type.

4.2.4 Research Model

Based on H1 to H13, the research model I analyzed in this study is shown in Figure 7.

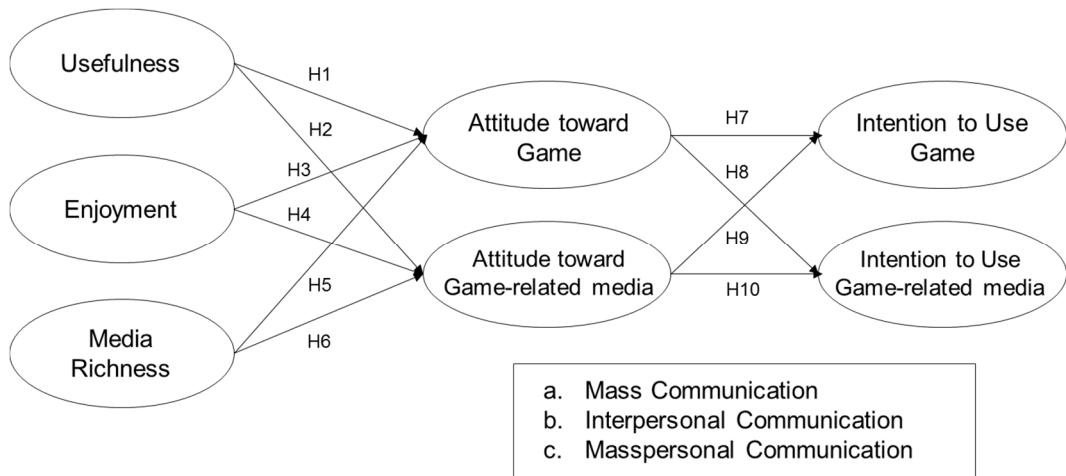


Figure 7 Research Model (H1-H10)

Structural equation modeling (SEM) technique was used to see two relationships. First, Equation (7) and Equation (8) are generated to see the effect of the characteristics of media (both game and game-related media) on the users' attitude toward those media. The characteristics of game-related media present the traits of game information contents including UGCs. Second, Equation (9) and Equation (10) are generated to examine the inter-media relationships between game and game-related media. The detailed equations

are below.

$$\begin{aligned}
 \text{Attitude_game}_i = & \\
 \alpha_0 + \alpha_1 \text{Usefulness_game}_i + \alpha_2 \text{Enjoyment_game}_i + \alpha_3 \text{Media richness_game}_i + \varepsilon_i & \dots \dots \dots \\
 \text{Eq. (7)}
 \end{aligned}$$

$$\begin{aligned}
 \text{Attitude_gmedia}_i = & \\
 \beta_0 + \beta_1 \text{Usefulness_media}_i + \beta_2 \text{Enjoyment_media}_i + \beta_3 \text{Media richness_media}_i + \varepsilon_i & \dots \dots \dots \\
 \text{Eq. (8)}
 \end{aligned}$$

$$\text{IU_game}_i = \gamma_0 + \gamma_1 \text{Attitude_game}_i + \gamma_2 \text{Attitude_gmedia}_i + \varepsilon_i \quad \dots \dots \dots \quad \text{Eq. (9)}$$

$$\text{IU_gmedia}_i = \delta_0 + \delta_1 \text{Attitude_game}_i + \delta_2 \text{Attitude_gmedia}_i + \varepsilon_i \quad \dots \dots \dots \quad \text{Eq. (10)}$$

4.3 Data and Results

This study constructed a draft questionnaire to collect data, and conducted a pilot test of the draft questionnaire in a sample of 20 graduate students. The final questionnaire was revised based on the results of the pilot test and comments from the pilot test participants. The survey was conducted online from April 16 to April 23, 2018 through a marketing company in South Korea. The respondents included 316 users who play games and obtain game information through various media. The sample included 180 males and 136 females and was extracted through a purposive quota sampling method to reflect the characteristics of the actual population of gamers. Specific demographic characteristics of the sample are shown in Table 5.

Table 5 Demographic properties of the sample (N = 316)

Basic characteristics	Classification	Population statistics	Percentage (%)
Gender	Male	180	56.96
	Female	136	43.04

Age	10s	61	19.30
	20s	64	20.25
	30s	64	20.25
	40s	61	19.30
	>50s	66	20.89

Table 6 Survey questionnaire and scale origin

Item	Scale origin
Informativity (INF)	
INF_1: Game content (information) with (mass/interpersonal/mass-personal communication) is useful.	Sjöblom & Hamari (2017).
INF_2: Using game content (information) with (mass/interpersonal/mass-personal communication), I am better informed about games I am playing.	
INF_3: Using game content (information) with (mass/interpersonal/mass-personal communication), I can be better informed about games which I would not otherwise have found.	
INF_4: Game content (information) with (mass/interpersonal/mass-personal communication) helps me get information on learning to play games.	

INF_5: Using game content (information) with
(mass/interpersonal/mass-personal communication), I learn
many things about games.

Enjoyment (ENJ)

ENJ_1: I find game content (information) with Sjöblom & Hamari
(mass/interpersonal/mass-personal communication) to be (2017).
enjoyable.

ENJ_2: Game content (information) with
(mass/interpersonal/mass-personal communication) is exciting.

ENJ_3: I have fun using game content (information) with
(mass/interpersonal/mass-personal communication).

ENJ_4: Using game content (information) with
(mass/interpersonal/mass-personal communication) is
entertaining.

Media Richness (MR)

MR_1: Game content (information) with Chen & Chang
(mass/interpersonal/mass-personal communication) quickly (2018).
reflects my feedback.

MR_2: If I have requirements while using game content
(information) with (mass/interpersonal/mass-personal
communication), I can communicate with content providers

directly.

MR_3: I expect I could get a quick response from the game content provider of (mass/interpersonal/mass-personal communication) media.

MR_4: I can establish a good relationship with a game content provider of (mass/interpersonal/mass-personal communication) media.

MR_5: (Mass/interpersonal/mass-personal communication) media communication systems enhance the efficiency of communicating with the game content provider.

Attitude toward Video Game (ATTG)

ATTG_1: I have a positive attitude about playing video games Agarwal & Prasad that I get information about through media. (1999)

ATTG_2: I think playing video games that I get information about through media is as good as other leisure activities.

ATTG_3: I have good feelings after playing video games I obtained information about through media.

ATTG_4: Getting information through the media helps me to have a good image of video games.

Intention to Use Video Game (IUG)

IUG_1: I plan to play a game that I learned about via game- Agarwal &

related media in the near future.

Karahanna (2000)

IUG_2: I intend to continue playing a game that I obtained information about.

IUG_3: I will play the game described by media content that I saw.

IUG_4: I expect to play the game that I obtained information about.

Attitude on Information Media (ATTM)

ATTM_1: I like using (mass/interpersonal/mass-personal communication) media.

Liu, Liao, & Pratt
(2009)

ATTM_2: (Mass/interpersonal/mass-personal communication) media provides as attractive information about games as other media.

ATTM_3: I have good feelings about (mass/interpersonal/mass-personal communication) media.

Intention to Use Information Media (IUM)

IUM_1: I intend to use (mass/interpersonal/mass-personal communication) media.

Liu, Liao, & Pratt
(2009)

IUM_2: I intend to increase my use of (mass/interpersonal/mass-personal communication) media in the future.

IUM_3: I expect that I will keep using (mass/interpersonal/mass-

personal communication) media.

This survey asked the 316 respondents about the media they use to obtain game-related information, and divided them into three groups: mass communication, interpersonal communication, and masspersonal communication. Respondents answered questions about the information media they used. When multiple media were used, respondents answered questions for each medium in duplicate. Game-related media were divided into mass communication through game-related TV programs and game-related TV channels, interpersonal communication through online communities, and masspersonal communication through live streaming services. In addition, respondents were asked to report the time spent using each media in one week, so that users could be identified by communication group. Using this information, this study constructed the groups in Table 7, defined as including users who used each communication type for at least 2 hours per week.

Table 7 Numbers and percentages of users by type of communication

Communication type	Game-related media	Population	Percentage
--------------------	--------------------	------------	------------

			statistics	(%, N=316)
Mass communication	Game-related TV programs and channels		265	83.86
Interpersonal communication	Online communities and chat rooms		296	93.67
Masspersonal communication	Live streaming services		278	87.97

In order to examine the 13 hypotheses presented in the research model in Figure 7, all questionnaire respondents were asked to rate usefulness, enjoyment, media richness, attitude toward games, attitude toward game-related media, intention to use the games, and intention to use game-related media. Each item is drawn from the existing literature, and Table 6 shows the items used in the survey and the literature from which each was drawn.

Data collected through the questionnaire are analyzed using SPSS Statistics 23 and AMOS 23 (IBM, Armonk, NY, USA). Table 8 describes specific measurements including factor loading, Cronbach's alpha, AVE, and CR. The variables collected in this study have sufficient internal reliability and convergent validity.

Table 8 Internal reliability and convergent validity of variables

Variable	Internal reliability	Convergent validity
-----------------	-----------------------------	----------------------------

		Factor loading	Cronbach's α	AVE	CR
Informativity (INF)	INF_1	0.704	0.874	0.820	0.958
	INF_2	0.757			
	INF_3	0.754			
	INF_4	0.786			
	INF_5	0.764			
Enjoyment (ENJ)	ENJ_1	0.640	0.845	0.876	0.965
	ENJ_2	0.744			
	ENJ_3	0.840			
	ENJ_4	0.765			
Media	MR_1	0.819	0.908	0.780	0.920
Richness (MR)	MR_2	0.818			
	MR_3	0.828			
	MR_4	0.792			
	MR_5	0.785			
Attitude toward Video Game (ATTG)	ATTG_1	0.773	0.878	0.871	0.964
	ATTG_2	0.730			
	ATTG_3	0.830			
	ATTG_4	0.822			
Intention to	IUG_1	0.771	0.889	0.847	0.957

Use Video	IUG_2	0.797			
Game (IUG)	IUG_3	0.821			
	IUG_4	0.814			
Attitude	ATTM_1	0.782	0.871	0.850	0.945
toward	ATTM_2	0.835			
Information	ATTM_3	0.804			
Media					
(ATTM)					
Intention to	IUM_1	0.782	0.889	0.863	0.949
Use	IUM_2	0.859			
Information	IUM_3	0.858			
Media (IUM)					

Before conducting the main regression analyses for the study hypotheses, it was tested that the model's goodness of fit. The goodness of fit results satisfied the acceptance criteria, as shown in Table 9, indicating that the model used in this study is a suitable model.

Table 9 Model fitting indices

Index	Value
Comparative Fit Index (CFI)	0.920

Tucker-Lewis Index (TLI)	0.910
Incremental Fit Index (IFI)	0.920
Root Mean Square Error of Approximation (RMSEA)	0.067

Table 10 Results for all groups

Hypothesis	Estimate (Standardized)	S.E.	C.R.	P	Result
H1: INF → ATTG	0.209	0.033	6.255	***	Supported
H2: INF → ATTM	0.313	0.036	8.680	***	Supported
H3: ENJ → ATTG	0.465	0.045	10.265	***	Supported
H4: ENJ → ATTM	0.573	0.050	11.518	***	Supported
H5: MR → ATTG	0.010	0.023	0.457	0.647	Not Supported
H6: MR → ATTM	0.184	0.024	7.536	***	Supported
H7: ATTG → IUG	0.939	0.049	19.134	***	Supported
H8: ATTG → IUM	0.210	0.036	5.887	***	Supported
H9: ATTM → IUG	0.083	0.031	2.683	***	Supported
H10: ATTM → IUM	0.791	0.047	16.879	***	Supported

*** Level of Significance at 1%

The results of the hypothesis tests for the research model are shown in Table 10. After analyzing all respondents without subdividing the sample by the types of communication

they use, it was confirmed that all the hypotheses except H5 were accepted. In other words, the usefulness and enjoyment that the users felt by using game-related media have significant effects on the users' attitudes toward the media and game. Likewise, previous studies that investigated users of television (Greene & Krcmar, 2005; Schmitt et al., 2003), interpersonal communication (Ishii, 2006), and multitasking using both communication (Wang & Tchernev, 2012) and games (Sherry et al., 2006; Wu et al., 2010), found that usefulness and enjoyment had significant effects on the intention of users to use each type of media examined in this study. Similar results, that the usefulness and enjoyment of information media have significant influences on attitudes and intentions to use a game, were found by research on web advertising. Media delivering information about games not only adds enjoyment and usefulness to game content, but also advertises the game. This is the same as the findings for web advertising, which determined that the informativeness and entertainment of advertising content had significant effects on the value of advertisements and people's attitudes toward them (Tsang, Ho & Liang, 2004; Ducoffe, 1996).

The media richness that a user feels about game-related media had a significant positive effect on user attitude toward the media itself. This extends the results of Lim and Benbasat (2000) and Liu, Liao and Pratt (2009). However, the media richness of game-related media in our overall-group results did not affect attitudes toward the game described by the information, and this result differed depending on communication type.

This study observed that attitudes toward games have significant effects on the

intention to use games and game-related media. This indicates that when a user's attitude toward a game is positive, the user is more likely to seek more information about the game. Similarly, attitudes toward game-related media have significant positive effects on the intention to use the game and game-related media. This suggests that the probability of playing a game increases when the user has good experiences engaging with game-related media from which they obtain game information. These are also similar to the results of web advertising studies, which found that attitudes toward advertisements that provide information about a product affects brand image, leading to real purchase intentions (Shaouf, Lü & Li, 2016). Therefore, game and game-related media complement each other.

Table 11 shows the results of multiple group analysis determining differences between the three groups: mass communication, interpersonal communication, and masspersonal communication. As seen in Table 9, the results differ according to type of communication.

Table 11 Parameter comparisons of three models.

Hypothesis	Estimate	P	Estimate	P	Pairwise parameter comparison
Mass Communication					
Interpersonal Communication					
H1: INF→ATTG	0.286***	< 0.001	0.347***	< 0.001	Not Supported (0.635)
H2: INF→ATTM	0.269***	< 0.001	0.476***	< 0.001	Supported (2.239)
H3: ENJ→ATTG	0.635***	< 0.001	0.237***	0.003	Supported (-3.327)

H4: ENJ → ATTM	0.631***	< 0.001	0.450***	< 0.001	Not Supported (-1.460)
H5: MR → ATTG	-0.184***	< 0.001	0.178***	< 0.001	Supported (5.664)
H6: MR → ATTM	0.045	0.215	0.325***	< 0.001	Supported (4.513)
H7: ATTG → IUG	0.971***	< 0.001	0.900***	< 0.001	Not Supported (-0.604)
H8: ATTG → IUM	0.242***	< 0.001	0.161***	0.008	Not Supported (-0.94)
H9: ATTM → IUG	0.047	0.483	0.115**	0.043	Not Supported (0.778)
H10: ATTM → IUM	0.764***	< 0.001	0.827***	< 0.001	Not Supported (0.492)
Mass Communication		Mass-personal Communication			
H1: INF → ATTG	0.286***	< 0.001	0.065	0.163	Supported (-2.549)
H2: INF → ATTM	0.269***	< 0.001	0.188***	< 0.001	Not Supported (-0.927)
H3: ENJ → ATTG	0.635***	< 0.001	0.346***	< 0.001	Supported (-2.710)
H4: ENJ → ATTM	0.631***	< 0.001	0.444***	< 0.001	Not Supported (-1.659)
H5: MR → ATTG	-0.184***	< 0.001	0.202***	< 0.001	Supported (6.432)
H6: MR → ATTM	0.045	0.215	0.438***	< 0.001	Supported (5.903)
H7: ATTG → IUG	0.971***	< 0.001	0.946***	< 0.001	Not Supported (-0.196)
H8: ATTG → IUM	0.242***	< 0.001	0.240***	< 0.001	Not Supported (-0.019)
H9: ATTM → IUG	0.047	0.483	0.078	0.110	Not Supported (0.376)
H10: ATTM → IUM	0.764***	< 0.001	0.732***	< 0.001	Not Supported (-0.264)
Interpersonal Communication		Mass-personal Communication			
H1: INF → ATTG	0.347***	< 0.001	0.065	0.163	Supported (-3.677)
H2: INF → ATTM	0.476***	< 0.001	0.188***	< 0.001	Supported (-3.362)
H3: ENJ → ATTG	0.237***	0.003	0.346***	< 0.001	Not Supported (1.084)
H4: ENJ → ATTM	0.450***	< 0.001	0.444***	< 0.001	Not Supported (-0.046)
H5: MR → ATTG	0.178***	< 0.001	0.202***	< 0.001	Not Supported (0.360)
H6: MR → ATTM	0.325***	< 0.001	0.438***	< 0.001	Not Supported (1.513)
H7: ATTG → IUG	0.900***	< 0.001	0.946***	< 0.001	Not Supported (0.362)
H8: ATTG → IUM	0.161***	0.008	0.240***	< 0.001	Not Supported (0.877)
H9: ATTM → IUG	0.115**	0.043	0.078	0.110	Not Supported (-0.496)
H10: ATTM → IUM	0.827***	< 0.001	0.732***	< 0.001	Not Supported (-0.887)

Notes: *Significant at the 10% level, **5% level, ***1% level

First, mass media richness does not affect attitude toward game-related media or attitude toward games. Media Richness Theory (MRT) argues that certain media are better able to transmit information under conditions of uncertainty and equivocality (Daft & Lengel, 1986; Daft, Lengel, & Trevino, 1987). According to MRT, the results of this study indicate that interpersonal communication and mass-interpersonal communication convey game-related knowledge to users with less uncertainty than mass communication. This study confirmed that mass communication had weaker effects than the other two communication methods.

Second, the effects of attitudes toward game-related media on intention to use games were different according to the type of communication. Analyses of groups according to communication type confirmed that attitudes toward game-related media had significant effects on the intention to use a game only in the context of interpersonal communication, in contrast to results of ungrouped analysis, which found that the information medium plays a complementary role to attract users to play the game regardless of communication types, similar to online advertisements. This implies that in game-related marketing, interpersonal communications including conversations with acquaintances and social activities in game-related online communities influence the intention to engage in actual game play rather than game content through other media. These results are in the same context as word of mouth (WOM) studies, which demonstrated that interpersonal

communication has marketing as well as consumer information processing effects (Wang, Yu, & Wei, 2012).

Third, this study confirmed that the usefulness of interpersonal communication media has a greater effect on attitudes toward game-related media than other communication types. This means that users experience the greatest utility when choosing media for interpersonal communication, and the information obtained through interpersonal communication is more useful to make decisions to play the actual game than information from mass and masspersonal communication. This finding is different those of Hsu and Lu (2007), in which enjoyment played the biggest role to people use online community. Rather, enjoyment of mass communication content plays a bigger role than other types of communication.

4.4 Discussion & Conclusion

In this study, it is compared that the effects of mass communication, interpersonal communication, and masspersonal communication in the video game industry. Therefore, this study confirmed the factors that build user attitudes toward games and game-related media and that attitudes toward games and game-related media affect users' intentions to use them. This study confirmed that the effects of usefulness, enjoyment, and media richness of game-related media, and relationships between media, vary according to the type of communication.

The results of our analysis show that the usefulness, enjoyment, and richness of game-related media have significant effects on users' attitudes toward media. Specifically,

media richness, which indicates the level of interaction between the information provider and receiver, differently influences attitudes toward games and game-related media, depending on communication type. Personal and social interactions perform important roles in optimizing the experiences that users feel when playing a game (Choi & Kim, 2004). This optimal experience also helps users to engage in games and to feel flow (Csikszentmihalyi, 1990). Media richness is a factor that indicates how promptly and actively the feedback between the information sender and receiver occurs with diverse cues in personal and social interaction. When information is transmitted through media with high richness, it is possible to reduce the ambiguity and uncertainty of information, and thus, users improve their enjoyment and satisfaction by acquiring information. In particular, game content includes a great variety of related information (how to level up, how to attack a boss, how to use an item, how to solve a problem in the easiest way, etc.). Therefore, acquiring relevant information and reducing uncertainty have major impacts on satisfaction, and communication methods that convey information play important roles in game play and satisfaction.

The results of this study have practical implications for the game industry. According to the characteristics of game-related information described in this study interpersonal communication transmits information best, including playing games with friends, chatting about game-related information with acquaintances, and sharing knowledge in online communities. This is because most game-related knowledge is accumulated through the experience of actual game playing (Hsiao & Chiou, 2012), and interpersonal

communication can convey not only formative information that can be recorded or transmitted, but also tacit knowledge related to know-how. In addition, in this study we confirmed that attitudes toward game-related media formed while using interpersonal communication significantly influenced the intention to use the game, in contrast to mass communication and masspersonal communication. These results imply that interpersonal communication can contribute to an influx of new players and continuous use by existing users because it offers the most active interactions and useful information about the game industry. In particular, Massive Multiplayer Online Games (MMOGs), which are very popular, have strong connections with online communities (Williams, Caplan, & Xiong, 2007). The online communities within MMOGs, known as "guilds," include participants who communicate not only within the game, but also in other media. This interpersonal communication in each guild plays an important role in players' stickiness to games through the constant accumulation of social capital (Hsiao & Chiou, 2012). The results of this study also confirm that WOM is effective for various types of video games as well as MMOGs, involving game-related interpersonal communication media such as guilds, and online communities such as internet bulletin boards.

Complementary relationships between games and game-related media are also suggested by the results of this study. First, the game enables the production of game-related content and facilitates the use of game-related media for users who are friendly to the game. In contrast, game-related media enable users who were satisfied with the game content to continuously play the game or to newly start the game. In particular, engaging

in game-related media using interpersonal communication not only strengthens the stickiness of existing game players by allowing them to accumulate social capital through active interactions among players, but also helps users to optimize their experiences by reducing uncertainty in information transmission. It also promotes the influx of new users who want to play a game due to WOM. Therefore, the game and game-related media complement each other, forming a sustainable media environment and ecosystem.

This relationship between games and game-related media provides diverse issues for game developers and marketers in game industry to study. First of all, WOM that uses interpersonal communication for game marketing and promotion should be considered to be important. In other words, game-related information should be actively shared among online communities and social communities within the game. In addition, immediate reactions to user feedback to game developers and administrators positively affect intention to use the game. This study confirmed that the usefulness and enjoyment of not only interpersonal communication, but also mass communication and masspersonal communication had effects on use of game-related content. Therefore, in order to spread game-related content such as character-based products, storytelling, and e-sports, mass communication and masspersonal communication should also be utilized appropriately, so that users who do not play games are led to use game content, thus increasing the size of game industry's pie.

Lastly, from the results of this study, it is confirmed that the hypotheses which made in Chapter 1 are all accepted. Since the traits (informativity, enjoyment, and media

richness) of user-generated contents which using interpersonal communication and masspersonal communication affect users' attitude toward game-related media and game and this also leads users' intention to use both media, Hypothesis B-1 is accepted. Hypothesis B-2 is also accepted because the user-generated contents in online communities affect the inter-media relationship between game and online communities. People's attitude toward online community is generated by the informativity, enjoyment, and richness of the UGCs on online communities, and this has positively affected people's intention to play the games which related the UGCs. The significant level of those hypothesis are described in Table 10.

Hypothesis B-1: User-generated content lead to users' behavioral change depending on media communication method (Accepted)

Hypothesis B-2: User-generated content affects the inter-media relationship (Accepted)

4.5 Implications & Limitations

Games have traditionally been considered separately from other media formats such as TV or movies (Dovey & Kennedy, 2006). However, the game industry is expanding and developing to include other forms of game-related content such as e-sports and game streaming. Previous research found that sales in the game industry are greatly influenced by streaming, and our results also determined that a game interacts with other media, indicating that user attitudes toward a game have significant effects on intentions to use game-related media. However, I was able to confirm that only attitude toward game-related media formed by using interpersonal communication plays a positive role in the intention to use a game. Game-related media involving mass communication and

masspersonal communication are also expanding the market for game content through communicating usefulness and playfulness for each media type. They promote users who do not even play games to consume game-related content such as character products, storytelling, and e-sports, and they perform important roles in expanding the game market.

This study has limitations in that it only considers users who are currently playing games or have intentions to play games. Therefore, it is necessary to study the characteristics and behaviors of users who do not play games but consume game-related media content only.

Chapter 5. Does media usage lead to psychological distress? The mediating effect of user participation on psychological well-being

5.1 Introduction

Manovich (2001) argued that the new media revolution caused by technological advances has transformed all cultures into computer-mediated forms of communication, production and distribution, resulting in a new "Information culture" where media content, form, and characters are converged. This culture has been defined as cyber culture (Lévy, 2001), Internet culture (Castells, 2002), or digital culture (Gere, 2009). One of the features of digital culture is that the level of participatory production in the media environment increases (Deuze, 2005). Jenkins (2004, p.93) also called the change comprehensively "cultural convergence," arguing that it promotes a new participatory culture by providing the public with tools to modify, archive and recirculate content.

The level of participation and interactivity have been higher in the media environment. In addition, the rise of Web 2.0 around 2005 made the user as an essential contributor in media environment (Constantinides & Fountain, 2008). It means a user is not only a consumer but mainly a content producer in the highly interactive and participatory media landscape. This wave in users' role change has led a boom in social media. Social media

services allowed people not only create their own contents, but also communicate and interact each other (Bright, Kleiser & Grau, 2015). As a result, the number of social media like Facebook has been grown over the last few years (Lee, Chou & Huang, 2014).

Recently, however, it has been seen that users have been tired in highly interactive and participatory media environment. An increasing number of users in social media have strayed from their social media activities (Guest Post, 2017). This has been studied as social media fatigue (Bright et al., 2015). This phenomenon has been seen not only in social media, but also in other media such as instant messenger. There have been studies of psychological and behavioral stress-related conditions and media fatigues due to excessive media participation and interaction (LaRose, Connolly, Lee, Li & Hales, 2014; Lim, Park, IJIMA & Ahn, 2017; Zhang, Zhao, Lu & Yang, 2016; Dhir, Yossatorn, Kaur & Chen, 2018). These studies claim that users are subjected to mental exhaustion due to various technological, communicative, and informative overload caused by their inter-media involvement and interaction (Dhir et al., 2018). However, past media fatigue studies have only been fragmentary determined how each media and user characteristics affect a particular media usage, such as social networking service (SNS) or instant messenger (see Table 11). However, it is important to see multiple media usage pattern to examine the effect of media considering new media environment, which people consume multiple media types simultaneously (for example, watching television while using a laptop or smartphone for looking up information or communicating with others) (Brasel & Gips, 2011).

Table 12 Literature Review on Media fatigue

Authors (Year)	Media	Methods & Data
Lee, Lee & Suh (2016).	Instant messenger	Structural Equation Modelling and questionnaire survey data
Shin & Shin (2016)	Instant messenger	Structural Equation Modelling and questionnaire survey data
Bright et al. (2015)	Social Networking Service	Confirmatory regression analysis and questionnaire survey data
Lim et al. (2017)	Social Networking Service	Structural Equation Modelling and questionnaire survey data
Chen & Lee (2013)	Social Networking Service	Structural Equation Modelling and questionnaire survey data
Rainie, Smith & Duggan (2013)	Social Networking Service	Telephone interview
Lee, Son & Kim (2016)	Social Networking Service	Structural Equation Modelling and questionnaire survey data
Zhang et al. (2016)	Social Networking Service	Regression analysis and questionnaire survey data
LaRose et al. (2014)	Social Networking Service	Structural Equation Modelling and questionnaire survey data
Dhir et al. (2018)	Social Networking	Structural Equation Modelling and

Service	questionnaire survey data
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Therefore, this study looks directly and indirectly at the impact of various media use on people's psychological well-being to see how media use ultimately plays a role in people's (psychological) health. In particular, to see the consequences of excessive user participation in previous studies that have caused media fatigue, I would like to look at how various media uses affect users' participation, and how such induced users' participation affects users' psychological well-being again. People's media usage is consisted by the use of new media and traditional media. New media includes SNS, instant messenger, User generated content (UGC or UCC) and Internet searching, while traditional media includes terrestrial television, non-terrestrial television, radio and newspapers. Data from the Korea Media Panel (KMP) Survey conducted by Korea Information Society Development Institute (KISDI) was used for analysis. The media usage variables utilized the average usage time recorded by survey respondents in their media diaries from 2013 to 2017, while the independent variable for depression utilized the increase value from 2013 to 2017 and the mean value of the independent self-esteem from 2013 to 2017. There is a distinction in this study that five years of media usage patterns, psychological health conditions, and user participation are used to look at the accumulated effects of diverse media usage, rather than the fragmentary effects.

5.2 Literature Review and Research Question

5.2.1 Media usage and psychological well-being

In most media fatigue studies, technological, informative, and communicative overload caused by user interaction and participation causes mental exhaustion and this mental exhaustion is defined as media fatigue (Bright et al., 2015; Lee et al., 2016; Ravindran, et al., 2014; Zhang et al., 2016). There are several criteria for measuring media fatigue. The factors that are usually addressed when talking about psychological well-being are anxiety, depression, and self-esteem. Among them, depression has been mainly addressed because it can cause psychological problems and other health-related symptoms like emotional and behavioral regulation. Depression is a state that the positive emotion is low, or the negative emotion is high (Sapolsky, 2004). The studies which saw the relationships between depression and new media usage are focusing on online communication (Wagner, Horn, & Maercker, 2014), and Social networking site (Banjanin, Banjanin, Dimitrijevic & Pantic, 2015; Błachnio, Przepiorka & Pantic, 2015; Woods & Scott, 2016). They all argued that the increased use of media will increase the degree of depressiveness of users. Based on this, Research Question 1 is set.

RQ1: Does media usage directly associate with psychological well-being (depress)?

In addition, as media increased interactivity among users and the proportion of social networking functions in the media increased, studies on self-esteem emerged that made people compare their situation with others and evaluate themselves (Coopersmith, 1967). Studies on the self-esteem are particularly focused on social networking service. These studies have been divided views that media usage plays a positive role (Gonzales & Hancock, 2011), a negative role (Vogel, Rose, Roberts & Eckles, 2014), and both positive or negative role (Valkenburg, Peter & Schouten, 2006) on people's self-esteem. Also, there are another view that people with low self-esteem regard social networking services as a safe place to express themselves (Forest & Wood, 2012). The casual relationship between these two variables, self-esteem and media usage has not been clarified so far. In this study, I extended media usage as not only just social media usage, but also other media usage with new media and traditional media. Through extending media usage into contemporary media environment which people use diverse media simultaneously, I would like to see the effect of this media usage in contemporary media environment on peoples' psychological factors. Accordingly, this study set up the following research question.

RQ2: Does media usage directly associate with psychological well-being (self-esteem)?

5.2.2 Media usage, User participation and psychological well-being

Researches have long existed that media usage affects users' behavior. There are studies show that news and public affairs television programming increase political participation (Norris, 2000; Rojas, Shah, Cho, Schmierbach, Keum & Gil-De-Zuñiga, 2005), and that new media such as social media are positively associated to political participation (Lee, Shin & Hong, 2018; Valenzuela, Somma, Scherman & Arriagada, 2016; Boulian, 2015).

Increasingly, however, studies have emerged that have seen the effect of media traits or the effect of users' purpose in using media on participation. Media play a conditional role depending on the type of content genre which it distributes, and this affects civic engagement and social trust (Moy & Scheufele, 2000). Some research has shown that informational uses of media are related to increased civic engagement, and uses of entertainment or diversion can be related to decline of engagement level (Shah, McLeod & Yoon, 2001).

Studies that have seen the effects of social participation and social interaction on psychological well-being have done around offline activities in the past. In particular, high interactivity and participation levels have had positive effects on psychological well-being, such as studies showing that offline participation, such as religion, church activities or political activities, sports clubs, and volunteer activities, causes better mental

health or reduces depressive symptoms level (Chiao, Weng & Botticello, 2011; Glass, De Leon, Bassuk & Berkman, 2006; Berkman, Glass, Brissette & Seeman, 2000). However, as technology advances, many communities have moved online, making it easier for people to be engaged in social participation and social interaction. As a result, studies have emerged to view the correlation between participation and psychological well-being in the online community. However, there is no study that has seen the cause-and-effect relationship, the effect of participation on psychological well-being.

RQ3: Does user participation mediate the effect of media usage on psychological well-being?

5.3 Research Framework

5.3.1 Data and variables

5.3.1.1 Data

This study used data from the Korea Media Panel (KMP) Survey conducted by Korea Information Society Development Institute (KISDI). KMP has collected media-related information about 9,000 individuals each year through stratified random sampling by region, gender, and age since 2010. As a result, this has become a longitudinal data tracking the same individuals. In particular, media diary data are data that respondents record the media activities they use and the device usage time over three days, providing useful information by knowing the time and frequency of the various media. In addition, the survey questions included not only the degree of respondents' participation such as knowledge production, content sharing and liking, writing comments, and participating on votes in online space, but also the degree of respondents' psychological well-being (depression and self-esteem) in 2013 and 2017. For this study, it is used that the media panel data collected between 2013 to 2017. I used sample consisted of 6715 individuals.

5.3.1.2 Media usage

In each year, respondents record their media usage time by media device, activity and space during three days in the media diary survey. This study derived the three-day average usage time from 2013 to 2017 and again obtained the five-year average usage time by media activity. The usage time of new media activities (SNS, Instant messenger, user generated content, and internet searching) and the traditional media activities (terrestrial TV, non-terrestrial TV, radio, and newspaper) are used in the analysis.

5.3.1.3 User participation

The KMP measures the respondents' frequency of participation behavior (writing, leaving comments, sharing and scraping) in online community or club, Internet news or debate board, online vote or recommendation, and online knowledge production every year. While previous studies saw user participation as political participation or civic engagement ((Norris, 2000; Rojas et al., 2005; Lee et al., 2018; Valenzuela et al., 2016; Boulianne, 2015; Moy & Scheufele, 2000; Shah et al., 2001), this study focuses on users' participation in knowledge activity. Survey questionnaire are described in Table 13 below. Every questionnaire estimated by 1 = 'none' to 6 = 'almost every day.'

In this study, the five-year period from 2013 to 2017 average values of the following items were derived and used for the analysis.

Table 13 Survey questionnaire about users' participation in KMP.

Contents	Questionnaire
Online community/club	<ul style="list-style-type: none"> - Have you read any articles written by other members in online communities/clubs in the last three months? - Have you commented on posts posted on online communities/clubs in the last three months? - Have you scratched posts on online communities/clubs in the last three months? - Have you uploaded posts on online communities/clubs in the last three months?
Internet news/discussion services	<ul style="list-style-type: none"> - Have you posted or written comments on Internet news/discussion boards in the last three months? - Have you ever scraped posts on Internet news/discussion boards, to your own blog/twitter in the last three months?
Online participation	<ul style="list-style-type: none"> - Have you participated in online surveys/polls/voting in the last three months? - Have you used online recommendation and rating systems in the last three months?

Online knowledge production – Have you posted a question on Internet knowledge services* in the last three months?

*Internet knowledge services: Wikipedia, Naver

Knowledge-in, Q&A boards, etc...

- Have you posted responses to Internet knowledge services in the last three months?
- Have you posted useful information contents* online for providing information purposes in the past three months?

* useful information contents: papers or reports, providing travel-related information, restaurant information, and expertise information on the personal blog/home page

5.3.1.4 Psychological well-being

Psychological well-beings were divided into depressions and self-esteem. The variable was measured in 2013 and 2017. Depression was measured by the frequency with which users felt irritated/negative/lethargy. In this study, the average frequency of these three elements is derived as depression variable, and the subtracting value of 2013 average from the 2017 average is used to see the effect of media usage on the change of emotion of depression.

At the KMP, self-esteem was measured by how respondents were evaluating themselves. It is measured as following eight questions: (1) I am living a life of purpose and meaning. (2) My social relations help me. (3) I enjoy everyday life and do my best. (4) I actively contribute to the happiness of others. (5) I can skillfully carry out activities that are important to me. (6) I am a good person and I live a good life. (7) I am optimistic about my future. (8) I am a respected person. In this study, the average level of these eight elements is derived as self-esteem variable and the average value these variables in 2013 and 2017 was used.

5.3.2 Models

Structural equation modeling (SEM) technique was used to see both the direct effect of media usage consisting of various media activities and the mediation effect of user participation on people's psychological well-being. SEM has been widely used to verify direct and indirect effect, or mediating effect of variables in the research models (e.g. Stolle, Soroka & Johnston, 2008; Prabhu, Sutton & Sauser, 2008; He & Li, 2011). The model for this study consists of following four equations.

$$\begin{aligned} Media\ usage_i = & \alpha_0 + \alpha_1 SNS_i + \alpha_2 INSTM_i + \alpha_3 UCC_i + \alpha_4 INSER_i \\ & + \alpha_5 TTV_i + \alpha_6 NTTV_i + \alpha_7 RADIO_i + \alpha_8 NEWSP_i + \varepsilon_i \quad \dots \dots \dots \text{Eq. (11)} \end{aligned}$$

$$Participation_i = \beta_0 + \beta_1 Media\ usage_i + \beta_2 X_i + \mu_i \quad \dots \dots \dots \text{Eq. (12)}$$

$$Depression_i = \gamma_0 + \gamma_1 Media\ usage_i + \gamma_2 Knowledge\ activity_i + \gamma_3 X_i + \rho_i \quad \dots \dots \dots \text{Eq. (13)}$$

$$Self\ esteem_i = \delta_0 + \delta_1 Media\ usage_i + \delta_2 Knowledge\ activity_i + \delta_3 X_i + \omega_i \quad \dots \dots \dots \text{Eq. (14)}$$

Media usage is a latent variable consisted of four types of new media activities and four types of traditional media activities (Eq.11). New media contains the use of SNS, Instant messenger, UCC, and Internet searching. Traditional media contains the use of terrestrial TV, Non-terrestrial TV, Radio, and Newspaper. In addition, this predicted use of

media, the latent variable, affects user participation (Eq.12). X_i , a variable of individual characteristics, was also used to predict user participation. Individual characteristics contains respondents' demographic information such as gender, age, education level, marriage status, and income (unit in Korean Won). User participation and media usage also affect people's psychological well-being, depression and self-esteem again with individual characteristics variables (Eq.13 & Eq.14). Therefore, γ_1 & δ_1 are the coefficient of direct effect of media usage on psychological well-being, and γ_2 & δ_2 are the coefficient of mediating effect of user participation.

5.4 Results

Table 14 shows the descriptive statistics of the variables in this study. The number of individuals utilized in analysis were 6715, and the individual characteristics, Media usage, User participation, Depression, and Self-esteem value of 6715 are like below. In the case of media use, people made the most use of terrestrial TV from 2013 to 2017, followed by non-terrestrial TV, instant messengers and Internet searches, as table 14 showed.

Table 14 Descript statistics of the variables used in this study (N = 6,715)

Independent Variables	Mean	Std. Dev.	Min	Max
<i>Media use (Unit in 15 min)</i>				
<i>New media</i>				
Social networking service	3.59	11.27	0	194
Instant messenger	17.26	23.85	0	292
User generated content	0.19	1.52	0	48
Internet searching	14.42	22.24	0	324
<i>Traditional media</i>				
Terrestrial Television	181.77	103.14	0	670
Non-terrestrial television	20.09	32.57	0	430
Radio	14.90	34.69	0	694
Newspaper	5.49	12.95	0	248

Dependent and mediation variables

User participation	12.66	3.23	11	41.4
Depression	-0.48	1.65	-6	5
Self-esteem	4.72	0.71	1.19	7

Individual characteristics (%)

Male/Female	43/57
Age (1-19/20-29/30-39/40-49/50-59/60+)	14.4/6.9/14.6/20.9/16.5/26.6
Education	
(below high school, high school, College or above)	38.2/ 34.2/ 27.6
Marriage (Married/Others)	64/36
Income (Unit in 10,000 KRW)	45.8/30.7/19.2/4.3
(No income/1–199/200–399/400–500+)	

Figure 8 shows the coefficient and statistical significance level of media usage's direct and indirect effect on people's psychological well-being. The latent variable, described by the use of four new media and four traditional media, confirmed to have a negative or insignificant effect on psychological well-being. First, the effect of media use on the increase in the frequency of five years of depression has been shown to be a positive effect ($\beta = 0.206$). This means that if the media is heavily utilized for five years, the depression will be felt more frequently. However, Table 15 and Figure 9 shows that

terrestrial and non-terrestrial TV viewing is negatively affecting the latent variable, media use. It can be interpreted that watching TV helped to ease emotion of depress. However, when looking at the impact of media on self-esteem, the use of media over five years has shown to have an insignificant impact on the average value of self-esteem felt by 2013 and 2017.

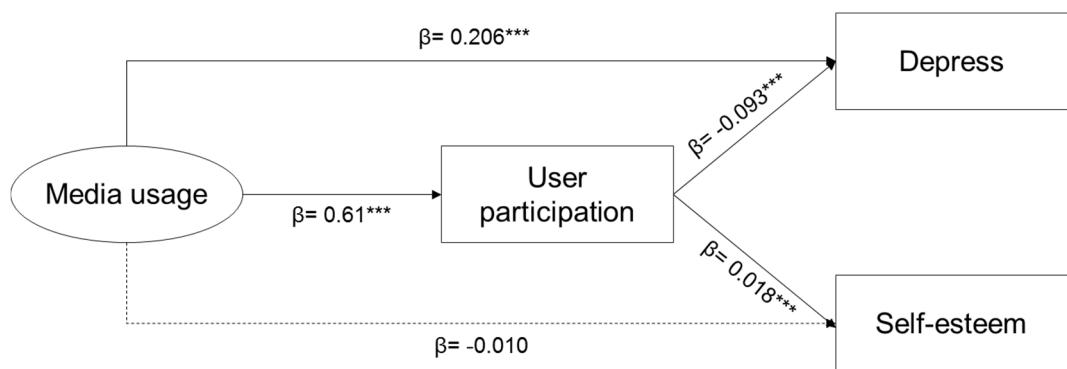


Figure 8 Direct effect/Indirect effect of Media use on depress and self-esteem

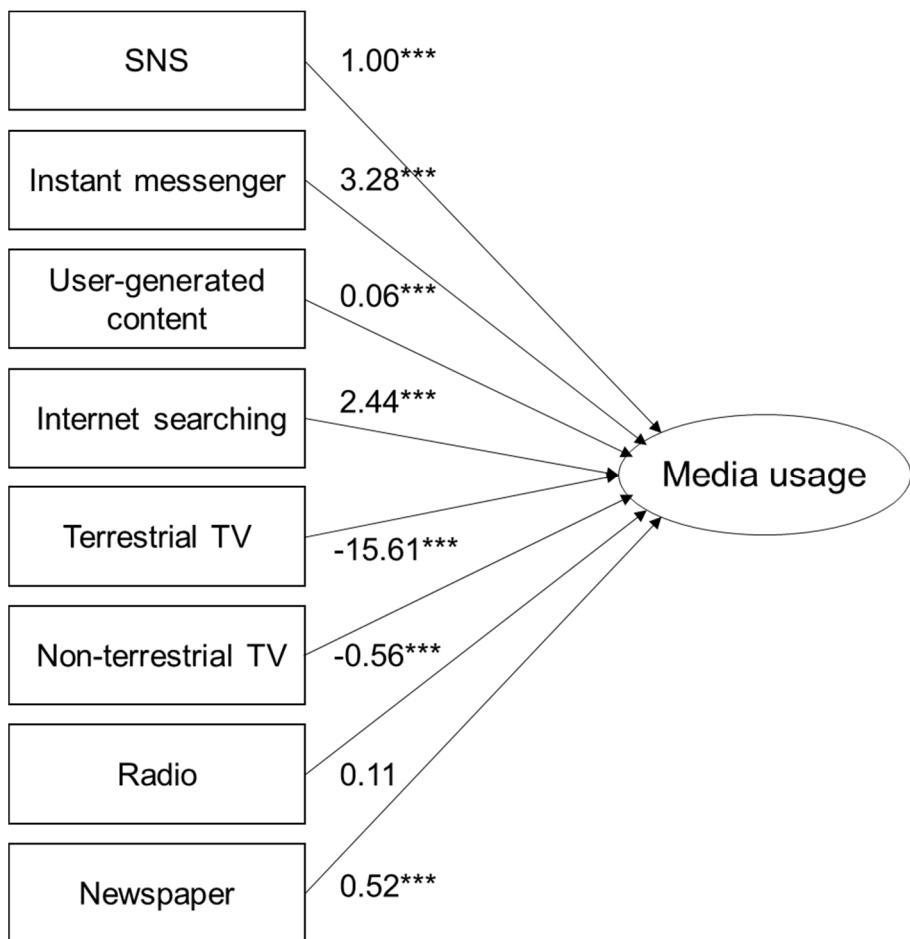


Figure 9 Coefficients and significant level of each media usage consisting the latent variable “Media usage”²

To see the indirect effect of media usage on psychological well-being, seeing the effect of media usage on user participation should be preceded. Analysis shows that indirect effects of media are mediated through user participation. The use of media has been shown to have a positive effect on the average value of user participation for five

² Notes: *Significant at the 10% level, **5% level, ***1% level

years ($\beta = 0.61$). The induced users' participation has been shown to have a significant effect on psychological well-beings, depression and self-esteem. First of all, it was shown that user participation had a significant negative effect on depression. This means that the higher the five-year average participation by users, the lower the stress from 2013 to 2017. In particular, terrestrial and non-terrestrial TV have negative effects on latent variable, media usage, as shown in Table 15 and Figure 9, indicating that they are having an indirect and positive effect on depressions. Second, it was shown that user participation also had a significant positive effect on self-esteem. This means that the higher the five-year average participation by users, the higher the satisfaction to themselves from 2013 to 2017.

Table 15 Details for the coefficients and standard errors of the structural equation models in Figure 4

	Media use	Participation	Depression	Self-esteem
Media use		0.61*** (0.054)	0.206*** (0.028)	-0.010 (0.010)
			-0.092*** (0.010)	0.018*** (0.004)
Type of Media				
Social Networking		1.000*** (0.129)		
Service				
Instant messenger		3.280*** (0.118)		

User Created Content	0.056*** (0.005)		
Internet searching	2.441*** (0.100)		
Terrestrial television	-15.612*** (0.573)		
Non-terrestrial television	-0.561*** (0.101)		
Radio	0.106 (0.107)		
Newspaper	0.516*** (0.042)		
<i>Individual characteristics</i>			
Male	-0.342** (0.100)	-0.162** (0.051)	-0.050* (0.019)
Age	0.549*** (0.096)	0.342*** (0.048)	-0.110*** (0.017)
Education	-0.046 (0.054)	-0.060* (0.027)	0.056*** (0.010)
Marriage	0.388** (0.114)	0.129* (0.058)	0.181*** (0.022)
Income	-0.110** (0.033)	-0.065*** (0.016)	0.055*** (0.006)

Notes: *Significant at the 10% level, **5% level, ***1% level

5.5 Implications

This study looked at the effects of media usage on people's psychological health by dividing them into direct and indirect influences. Also, by dividing the latent variable of media use into four new media and four traditional media, it could be seen that how different kinds of media are affecting psychological well-being differently.

First of all, we could see that the impact of new media and traditional media on users' psychological well-being and participation are different, respectively. The total media use's direct effect was identified as having a negative effect on depression and not a significant effect on self-esteem. In particular, SNS, instant messenger, UGC, and internet searching belonging to New Media have been found to cause mental stress, such as the results of prior research that users can feel media fatigue based on their interactivity (Wagner, Horn, & Maercker, 2014; Banjanin, Banjanin, Dimitrijevic & Pantic, 2015; Błachnio, Przepiorka & Pantic, 2015; Woods & Scott, 2016). In contrast, traditional media were divided into TV and newspaper, each having a different effect on the depression. Terrestrial and non-terrestrial TV were found to have negative effects on depression, while newspaper was found to have positive effects. It is explained by the result of the study of Potts & Sanchez (1994). Potts & Sanchez (1994) explained that the reason people watch television is to get away from depression. Using television viewing to escape unpleasant feelings and stimuli that could potentially exacerbate those feelings. However, they explained that people fall back into depression when they use news

content while watching television. This is in the same vein as the people who used the newspaper felt more depression. The results can also be inferred that the KMP survey did not distinguish between paper newspapers, Internet newspapers, or newspaper subscriptions via smartphones when collecting the newspaper usage time data.

Second, looking at the indirect impact of media usage, it was shown that the use of media has a positive effect on the user's participation. This was a different result from the results of the Chapter 3, which used 2018 data on analysis only. It is shown that five years of media usage had a significant effect on users' level of participation over five years, meaning that the effects of media use would be accumulated over time. In particular, new media usage and newspaper usage have been confirmed to have a positive impact on users' participation. These results were the same as the preceding studies that confirmed that SNS had a positive effect on the political participation (Lee, Shin & Hong, 2018; Valenzuela, Somma, Scherman & Arriagada, 2016; Boulian, 2015). However, traditional media has been found to have negative effects on user participation, which is different from prior research that television public broadcasting has positive effects on users' political participation (Norris, 2000; Rojas, Shah, Cho, Schmierbach, Keum & Gil-De-Zuñiga, 2005). This can be inferred that user participation discussed in this study was mainly focused on knowledge creation, resulting in different outcomes. This is because participation in politics and knowledge creation is a different kind of participation.

Third, user participation has also been shown to have a positive effect on users' psychological well-being. This was examined as a reduction effect for users' depression

and an enhancement effect for users' self-esteem. In the past, studies have continued to show that offline participation has a positive effect on users' mental health (Chiao, Weng & Botticello, 2011; Glass, De Leon, Bassuk & Berkman, 2006; Berkman, Glass, Brissette & Seeman, 2000), but there are no studies that have seen the cause-and-effect relationship between online participation in users' mental health. However, there are some studies that have seen the relationships or correlations between them, such as Valenzuela, Park & Ke (2009). They argued that the use of SNS, such as Facebook, is positively linked to the social capital, satisfaction, social trust, civic engagement, and political partitioning of users. There is novelty in this study that it has identified causality by observing mediating effect of participation in knowledge activity on people's psychological well-being.

Lastly, it is confirmed that the hypotheses which constructed in Chapter 1 are accepted based on the results of this Chapter. Hypothesis C-1 is confirmed by the research questions 1 and 2 in this study. Table 15 shows coefficients and significant level of the relationship between media usage and users' psychological well-being. Media usage had significant negative impact on users' depression increasing during five years (2013 to 2017). However, it has insignificant impact on users' self-esteem. So, Hypothesis C-1 is partially accepted. Table 15 also shows that people's media usage affects their five years' average participation level, and this participation level had significant positive impact on people's psychological well-being factors, depression and self-esteem. It means users' participation has mediating effect on the impact of media usage on people's psychological well-being. While the direct effect of media usage on users' psychological well-being is a

negative one, but the indirect effect of media usage through people's participation is a positive.

Hypothesis C-1: Media use affect users' psychological well-being (Accepted)

Hypothesis C-2: User participation mediates the effect of media usage on users' psychological well-being (Accepted)

In addition, it is also showed that traditional media and new media had different role in users' media usage like Chapter 3 showed. Chapter 3 confirmed that traditional media and new media had different role on people's participation in knowledge activity. While traditional media have been used as knowledge acquisition tools, new media have been used to access online space users to create more knowledge. In this Chapter, it is examined that traditional media have positive direct effect on people's releasing depression, however, it negatively affects people's five years' average participation in knowledge activities, so it prevented overcoming depression or raising self-esteem with social activities. On the contrary to this, while using new media had negative direct effect on people's depression level, but it positively stimulated people's participation in knowledge activities which leads people's psychological well-being that enhancing self-esteem and releasing depressions.

5.6 Conclusion & Limitation

It was confirmed that the use of media, especially use of the media that allows users to participate in knowledge activities, makes users more likely to be in a healthier state of mind. This is a different view from previous studies that interactivity causes fatigue for users on social networking sites or instant messengers. If users actively "participate" and engage rather than just passively access to enjoy media content, or fragmentary use of communication between users, media use will eventually help users' psychological health. This is linked to terrestrial and non-terrestrial television viewing without participation in media use had negative coefficients. With these results, this study proposes the role of new media in digital culture, which constructed in media convergence environment. New media should provide media environments that users can engage in diverse participation (political participation, social participation, and participation in knowledge production). In addition, media policy makers should focus on these roles of new media so that they can maintain a media environment that can further promote user participation, since media promoting user participation has a positive effect on users' psychological well-being in the media environment.

There are several limitations in this study. Due to the limitations of KMP data, the variables measuring the user's psychological well-being exist only in 2013 and 2017, so

the causality was verified by utilizing their average or difference values. To address this, the study utilized the average values over a period of five years, with the exception of the individual characteristics variables. If all the years of data were available in the study and panel data could be used, a richer conclusion would be found. The failure to use various variables for psychological well-being other than depression and self-esteem also leaves as a limitation.

Chapter 6. Discussion and Implications

6.1 Summary

The aim of this study is to understand users' participation in knowledge activities such as creating, sharing, modifying, using information and knowledge content, with media environment perspective. By examining the association between the user, media, and knowledge content, intermedia relationship with users' participation and media-user interactions which forms sustainable media environment were suggested. Three studies were used to verify the hypothesis with empirical analyses.

Chapter 3 examined the influence of media on users' participation in knowledge activities. Different kinds of media devices and media activities had different effects on users' participation, and depending on the characteristics of the users, the media that influence the users' participating behavior were different. This chapter, in particular, examined the effect of media on users' participation in knowledge process and in knowledge creation, sharing, and the use of the knowledge. First of all, this study found that people with higher use of traditional media, such as TV, radio, and newspapers, are more likely to be "active participants" with brisk knowledge activities. Second, the medium that led to a lot of knowledge activity within the group of "active participants" was smart devices. What does this mean? Traditional media and new media (smart devices) play different roles in the media environment, suggesting that they all have positive effects on knowledge activities. It can be interpreted that users are using

traditional media, which has been used as information sources in the past, as a medium for knowledge inflow and smart devices to increase accessibility to knowledge participation. Thus, the previously established Hypothesis A was accepted, and the roles of new and traditional media were also recognized.

Hypothesis A: Media usage will positively affect users' participation, depending on the media communication method & whether it is new media (Accepted)

Chapter 4 examined how information delivered by user-generated content, a result of user participation, and by mass media, a traditional medium of information delivery, affect users' behavioral changes and the intermedia relationship. The media which deliver user-generated content was divided into online community (interpersonal communication), and live streaming service (mass-person communication) depending on the communication method. In the gaming industry, the results confirm that game-related information, which is mediated by user participation, changes users' attitude towards the game more positively and links them to actual game-playing intentions than when it is not mediated by users' participation. In particular, the online community, which users interact closely with when they transmit game-related information has the greatest impact on users' behavioral change. It was also confirmed that the intermedia relationship between game and game-related media, where game-related information is delivered has seen more sustainability by interacting with each other based on users' participation. In other

words, the gaming industry promoted the creation of game-related information content by users, and the media where game-related information content is delivered has been promoted by the gaming industry, and these result in a whole pie of the gaming industry getting bigger. It is also confirmed that user participation strengthens the sustainable relationship between media within the media environment.

Hypothesis B-1: *User-generated content lead to users' behavioral change depending on media communication method (Accepted)*

Hypothesis B-2: *User-generated content affects the relationship between media (Accepted)*

Finally, Chapter 5 confirmed that the use of media can have a positive effect on users' psychological well-being, as opposed to recent studies, which showed that excessive activity and participation induce media fatigue. Previous media fatigue studies focused on only one media such as SNS or instant messenger to confirm that particular media traits could cause media fatigues among users, but in this study, various kinds of media usage which constituted as both new media and traditional media, and the cumulative effect over five years were investigated. Studies have shown that media use has a direct negative or insignificant effect on users' psychological well-being, but the use of media in which user participation is mediated has a positive effect on users' psychological well-being. This effect was especially evident in the use of new media. In addition, it also

showed that traditional media and new media had different roles in users' media usage as revealed in Chapter 3, which confirmed that traditional media and new media had different roles on people's participation in knowledge activity. While traditional media have been used as knowledge acquisition tools, new media have been used to access online space by users to create more knowledge. In this Chapter, it is examined that traditional media have a positive direct effect on releasing people's depression, however, it negatively affects people's five years' average participation in knowledge activities, so it prevented the overcoming of depression or raising self-esteem with social activities. On the contrary, using new media had a negative direct effect on people's depression level, but it positively stimulated people's participation in knowledge activities, which leads to people's psychological well-being that enhances self-esteem and releases depression.

Hypothesis C-1: *Media use affect users' psychological well-being (Partially accepted)*

Hypothesis C-2: *User participation mediates the effect of media usage on users' psychological well-being (Accepted)*

6.2 Managerial Implication

This thesis provides several managerial implications in the view of the framework of media environment. Users' participation is an important value for many companies. Marketing with user participation is more powerful than the marketing carried out unilaterally by the company, especially since participation of the 'lead users' results in product or service innovation.

First, it is important to understand the role differences between traditional and new media and make appropriate use of them in marketing. In Chapter 3, it was observed how traditional and new media each play a role in the participation of users in knowledge-producing activities. In fact, it was smart devices that stimulated the practical behavior of "active participants" with the most active knowledge-producing activities. This means that for content such as UCCs or users' review on products and services that will be produced through users' participation in the marketing process, the company should provide media environment suitable for smart devices. Users mostly consume short content via smart devices anytime and anywhere, so suitable content length and design should be considered for it. Conversely, traditional media such as the TV and radio have been identified as windows used for users to acquire knowledge. This means that TV or radio advertising should focus on communicating the overall information of the product. Of course, advertising mass media to emphasize brand image is also known to be effective, but in order to elicit participation from users, it will be effective to provide detailed information such as actual product function, new technology, and service

convenience and price.

Also, the WOM (Word-of-mouth) effect of the online community is not as fragmentary as believed. Chapter 4 looked at this around the gaming industry. Game-related information content generated by the online community was having the most positive impact on users' intention to play the game and their attitude towards the game. Recently, the Korean gaming industry has been spending a lot of money on game-related marketing. It can be easily seen as advertisements on the TV, buses, and outdoor locations using celebrities and high-end CG technology. However, this study found that the mass media has a lower impact on users' game-related attitudes and intentions to play than online communities or live streaming services. Currently, the *League of Legends*, the 2019 global No. 1 game *Riot games*, has a very well-developed online community inside and outside of Korea, and they are marketed mainly through short video content that unravel the story of their characters in the game through YouTube. As such, game-related content in online communities and real-time streaming services platforms is re-produced, shared, and developed into various genres (e.g. video, music, movies, e-sports) to maintain a more sustainable ecosystem of the gaming industry. This may be why *League of Legends* has been loved for so long by global fans.

6.3 Policy Implication

This study showed that policy efforts are needed to create a media environment for user participation. The results of this study showed that users were the core players within the media environment, and the sustainable growth and intermedia relationships of the media environment were stimulated by users' participation. How can we help users use media soundly and promote their participation to maintain the sustainability of media environment and have a positive effect on users' psychological well-being?

Recently, South Korea's online portal service *Naver* banned people from posting comments on political news articles. *Daum*, another portal service, also considered banning the public from posting comments on entertainment news, starting from November 2019. While comments on online news articles have opened the doors for public debate, policymakers have been concerned about the side effects. They blocked the function of the comment itself as a regulatory measure to prevent malicious comments or comments that deliver fake news.

However, the results of this study showed that the reproduction, sharing, and public opinion posted through comments by users' participation have a positive impact on users' psychological well-being as well as on the overall ecosystem of the media. Sometimes people can read comments that are better than the quality of the original Internet news articles, broaden their views by listening to others, and increase their self-esteem or

satisfaction by writing comments. Media ecosystems can also be actively circulated through public opinion generated by the comments.

Rather than disabling comments, the government should first publicize the perception that malicious comments are a serious crime almost on a par with other ordinary crimes. Just as people do not take leniency for criminal activities like robbery and murder, it is necessary to take the same action for malicious comments. In addition, online portal sites will need to strengthen filtering algorithms and monitoring systems for malicious comments to block them in real time.

The same is true for fake news and comment manipulation. Blocking systems inside portal sites should be strengthened, and news should not be sorted by the number of recommendations or comments. Subscribing to news should be left to users' discretion and it should not be used as an indicator of the quality of the article based on the number of comments. An example of this is the *New York Times*, the *Wall Street Journal* and the *Washington Post* in the U.S. that do not make comments immediately available on the first screen of the article. Germany also imposes strict standards to prevent the spread of fake news. If someone leaves fake news in the form of comments, he or she must delete it within 24 hours and pay a fine of up to 50 million euros (about 65 billion won).³

³ BBC Korea (2019. 11. 1) Available from: <https://www.bbc.com/korean/news-50258547>

Chapter 7. Conclusion

With the development of information technology and communication sectors, the media environment has changed in various dimensions. The newly emerged concept, hybrid media ecology represents the contemporary media environment, and it describes the changes in the boundaries between the existing media environment that makes it difficult to distinguish them. Under these changes, value creation mechanisms have changed not only within the service sectors that have often been addressed in past studies (Haile & Altmann, 2016; Gebregiorgiology & Altmann, 2015), but also within the media environment.

In the past, value creation in the media environment used to be explained by a user-centric and an industry-centric approach (Bechmann & Lomborg, 2013). User-centric studies explain that the best value within the media environment is for users to feel social belonging, self-presentation, and gratification. On the other hand, industry-centric studies describe that revenue increase, or business improvement (innovation, development, and profiling) are the core values in the media environment. In the contemporary media environment, all of these values are generated by the users. The traditional producer-text-audience model, which explains audience's passive role in value creation of media environment is collapsed when users create the content themselves, or media

professionals utilize users' creations or users' activities as part of their media product (Bruns, 2008; Green & Jenkins, 2009; Tapscott & Williams, 2006; Van Dijck, 2009).

In other words, users' participation which is a preceding condition of user-generated content and users' activities in diverse areas is the key factor in value creation in the contemporary media environment. This bottoms-up economics that is based on new technologies and led empowered customers and enabled prosumers, fosters social sustainability (Basmer, Buxbaum-Conradi, Krenz, Redlich, Wulfsberg & Bruhns, 2015).

In this study, I tried to understand the relationship between the user and the media with users' participation in knowledge activity, which is a crucial element in not only value creation but also for the sustainability of the contemporary media environment. To conclude, this dissertation recommends two factors for the sustainability of contemporary media environment.

First, the traditional and new media should be utilized without bias. While the traditional and new media have different role in users' participation in knowledge activities and psychological well-being, media professionals or policymakers should understand these relationships. In the past, some media studies predicted the collapse of traditional media with the advent of the new media. For example, with the advent of Netflix and YouTube, there are views which predict the end of traditional terrestrial TV services. However, according to this study, each media device and activity are complementary or considered as totally different to each other because the characteristics of people using these media services or devices are all different and their effects on

people vary depending on the type of media. It is essential that various media elements exist within the media environment to provide knowledge to various users and to bring out their knowledge activities to create value for a sustainable media environment.

Second, media professionals should understand the intermedia relationship between user-generated content services and other media services. Users' voluntary production and diffusion of knowledge contents related to media products play a key role in the value chain of media products. In Chapter 4, I provided an example of online gaming as a media product. Recently, there has also been a case of developing an online gaming product that has formed a UGC production-friendly environment, taking into account these value chains from the stage of the product development.⁴ These user-participatory-based intermedia relationship increases the sustainability of the value creation like users' continuous play, entrance, flow experience, and related market expansion in the media environment.

⁴ Jack Yarwood. *How Player Unknown's Battlegrounds became a Twitch success story*, Available online: <https://www.telegraph.co.uk/gaming/what-to-play/player-unknowns-battlegrounds-became-twitch-success-story/>, (Accessed April 2018).

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Abstract (Korean)

미디어 시장 내의 기술 발전은 이용자의 미디어 환경을 다양한 차원에서 변화시켜 놓았다. 특히 인터넷, 진보된 네트워킹 기술, 스마트 디바이스의 등장은 이용자들이 다양한 미디어 콘텐츠를 시간적, 공간적 제약 없이 즐길 수 있는 미디어 환경을 제공하였다. 과거 미디어 연구들은 이러한 미디어 환경을 ‘하이브리드 미디어 생태계’라는 개념으로 설명했다. 이는 미디어 환경 내의 요인들, 즉, 미디어, 기술, 이용자, 커뮤니케이션을 구분 짓는 것이 무의미해지고 디지털-아날로그, 주류-비주류, 전통-뉴미디어의 경계가 모호해지는 현상을 묘사하는 개념이다.

이러한 현대 미디어 환경 하에서 미디어 연구들은 점점 미디어, 기술, 커뮤니케이션과 같은 요인보다 ‘이용자’의 역할 비중이 높아지는 것에 대해 초점을 맞춰왔다. 특히 Web 2.0이 적용된 미디어 서비스들의 지속적 등장은 이용자에게 생산자와 소비자의 역할을 모두 부여하는 ‘프로슈머(prosumer)’의 개념을 적용하게 하였다. 이용자들은 스스로 자신이 원하는 지식과 정보를 담은 콘텐츠를 제작하고 이렇게 제작된 사용자 제작 콘텐츠 (User-generated Content, UGC)들은 다시 다른 이용자들의 행동에 영향을 끼치거나 다른 미디어 콘텐츠, 더 나아가 주류 미디어 시장까지 변화시키기에 이르렀다. UGC 뿐만 아니라 이용자들이 생성하는 소셜 네트워크 혹은 집단지성은 기업의 자산으로써 활용되기도 하는 등 이용자의 참여는 현대 미디어 환경 내의 지속적 가치 창

출을 담당하게 되었다.

본 연구는 현대 미디어 환경의 관점에서 정보 및 지식 콘텐츠를 생성, 공유, 수정, 이용하는 지식 활동에 대한 이용자의 참여를 이해하는 데에 목적이 있다. 이용자, 미디어, 콘텐츠의 관계를 미디어 환경의 관점에서 이해하고, 연구의 결론에서 지속 가능한 미디어 환경을 형성하는 이들의 관계와 역할, 이를 활용하는 방안을 제안하고자 한다.

첫 번째 연구에서는 한국정보통신정책연구원에서 매년 조사하는 미디어 패널 데이터의 2018년도 데이터를 활용하여 한국 인구 약 만 명을 온라인 지식 활동 참여 정도에 따라 적극적 참여자, 소극적 참여자, 방관자로 분류해 본다. 분류에는 K-means 클러스터링 알고리즘을 활용하였다. 또한, 순위 프로빗 (Ordered Probit) 모형과 최소 제곱 회귀 모형 (Ordinary Least Squares regression) 을 활용하여 각 모형에서 어떠한 미디어 이용이 이용자들을 적극적 참여자로 유인하는지, 이용자 참여 그룹에 따른 미디어 이용 패턴이 어떻게 다른지 확인한다. 연구 결과, 지식 유입과 접근성의 측면에서 뉴미디어와 전통미디어가 담당하는 역할이 나뉘는 것을 확인할 수 있었다. 특히 적극적 참여자의 참여를 늘이는 데에는 스마트 디바이스만이 유의한 영향을 끼치는 것을 확인할 수 있었다.

두 번째 연구는 이용자들의 참여로 생산된 지식 콘텐츠가 다시 이용자들의 행동변화를 야기하는지 확인하고자 하였다. 이를 확인하기 위하여 게임 산업이 관찰되었다. 게임 산업은 내에서는 게임 관련 정보 콘텐츠가 다양한 미디어에서 공유 및 생산되는데, 이를 미디어는 각기 다른 정도의 상호작용을 제

공한다. 연구 결과, 온라인 커뮤니티에서 이용자들이 생산해내는 게임 관련 정보 콘텐츠가 이용자들이 관련 게임에 대해 긍정적인 태도를 가지고, 높은 이용 의도를 가지게 하는 데에 가장 큰 영향을 끼치게 하는 것을 확인할 수 있었다. 이는 이용자들이 행동 변화가 이용자들이 생산해낸 지식 콘텐츠에 의해 영향을 끼치는 것을 확인한 연구이기도 하지만, 게임 관련 미디어(온라인 커뮤니티)와 게임이라는 미디어가 어떻게 이용자들에 의해 상호작용하고 지속 가능한 생태계를 가지고 있는지 확인한 연구이기도 하다.

세 번째 연구는 미디어 산업에서 이용자들의 과도한 참여와 상호작용으로 인해 생기는 심리적 스트레스와 피로를 고려하여 미디어 사용이 이용자들의 심리적 건강에 어떠한 영향을 끼치는지 직접적, 간접적 역할을 살펴보고자 하였다. 연구 결과, 미디어 이용이 지식 참여를 촉진하여 생기는 간접적 영향으로 심리적 건강에 양의 영향을 끼치는 것을 확인하였다.

본 연구는 현대 미디어 환경의 지속 가능성은 위한 미디어와 이용자의 바람직한 관계, 이용자 참여의 역할을 제시하기 위해 미디어 환경 내의 사용자와 미디어의 관계를 살펴보았다. 이를 위해 이용자들의 지식 생산 활동과 참여에 미디어가 어떠한 역할을 미치는지, 이를 넘어 미디어의 ‘건강한’ 참여 촉진 역할이 어떠한지를 살펴보았다. 연구 결과 전통적 미디어와 뉴미디어가 각기 다른 상호작용의 레벨을 통해 이용자들에게 다른 영향을 끼치고 있는 것을 확인하였다. 또한 이용자들이 생성해내는 지식 콘텐츠는 다양한 미디어를 서로 연결지음으로써 이용자 참여가 높을수록 미디어 생태계를 확장하고, 지속 가능하게 하였다. 따라서 본 연구는 뉴 미디어가 수행하는 역할, 미래에

발전해 나가야 할 방향을 ‘이용자들의 참여 촉진을 통한 지속 가능한 미디어 생태계 구성’으로 제안하는 바이다. 또한, 지속 가능한 미디어 환경 유지를 위해 다음의 두 가지 전략을 제안한다. 첫째, 미디어 환경에서 중요한 가치인 이용자 생성 지식의 지속적 생산을 위해 전통 미디어와 뉴미디어가 서로의 역할을 보완하고 적절히 잘 이용되어야 한다. 둘째, 미디어 전문가들은 이용자 참여가 매개하는 미디어 간 상호작용의 매커니즘을 이해하고 이를 미디어 서비스 개발 및 유지에 활용해야 한다. 본 연구 결과는 미디어를 활용하는 산업에서 이용자들을 위한 마케팅을 수립하고, 이용자들의 참여를 통해 달성해야 하는 정책적 목표와 소셜 이노베이션을 달성하기 위한 방안 수립을 위해 활용될 수 있을 것이다.

주요어 : 미디어 융합, 뉴미디어, 이용자 참여, 지식 생산, 미디어 환경

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