

A Comparative Study of the Effects of Consumer Innovativeness, Self-esteem, and Need for Cognition on Online Activity before and after COVID-19

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Abstract

This study tried to identify factors affecting online activity before and after the COVID-19 pandemic. To this end, the effects of consumer innovativeness, self-esteem, and need for cognition on the activity of online media such as Internet and social media were investigated, and whether privacy concerns had a moderating effect. For this study, survey data from 2019(before the outbreak of COVID-19) to 2021(after the outbreak of COVID-19) of the 'Korea Media Panel Survey' surveyed by the Korea Information Society Development Institute was used for analysis.

The research results that affect Internet activity are as follows. Before the outbreak of COVID-19, it was found that hedonic innovativeness and social innovativeness had a positive effect and cognitive innovativeness had a negative effect on increasing Internet activity.

There was no moderating effect on privacy concerns. The period after the outbreak of COVID-19, need for cognition was found to have a positive effect on increasing social media activity. In addition, the moderating effect of privacy concerns was found in the relationship between need for cognition and Internet activity.

There was no privacy concern effect before the outbreak of COVID-19, and the privacy concern effect appeared on functional innovation and need for cognition after the outbreak of COVID-19. This study aims to present various implications for companies to understand the characteristics of online consumers using the Internet and social media after the pandemic.

Keywords : Consumer Innovativeness, Self-Esteem, Need For Cognition, Privacy Concern, Online Activity, Pandemic

Received : 2023. 09. 18. Revised : 2023. 10. 10. Final Acceptance : 2023. 10. 20.

※ This paper is excerpted from the doctoral dissertation of Myung Gwan Lee in 2021.

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1. Introduction

Since the first COVID-19 confirmed case occurred in Korea in January 2020, the government's social distancing policy has required digital transformation to non-face-to-face methods in various fields such as education, work, consumption, and leisure [Lee et al., 2021]. The direction of quarantine policies and the social atmosphere emphasizing such non-face-to-face contact had a significant impact on the consumption environment. As the online consumption market increased during the COVID-19 period, online media activity also increased. In addition, overall online media activities such as online search, online commerce, SNS activity, and video viewing showed a large increase.

Companies experienced during the COVID-19 social distancing period are expected to further increase their investment in online and social media to catch consumers who are more focused online than offline in the future pandemic. As supporting the importance of online investment in a pandemic situation, companies that focused on online showed great performances in the COVID-19 situation.

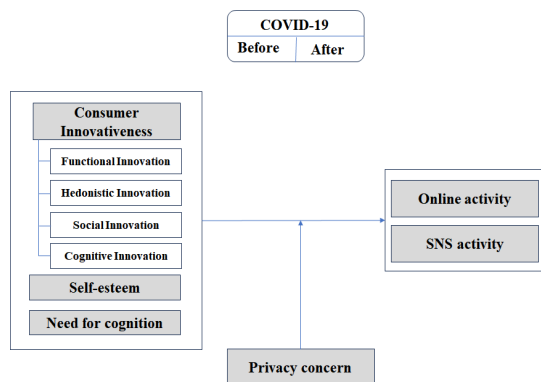
According to CB Insight, which provides market intelligence on private business and investor activity, the impact of COVID-19 has hit an all-time high in the number of unicorns. The rapid increase in unicorn companies in the COVID-19 situation is because investment funds in the global market due to the pandemic have been concentrated in the online sector. It is analyzed that this has served as a background for the growth of e-commerce, fintech, and internet service startups as un-fact services that can avoid direct contact between individuals have attracted attention due to the influence of non-face-to-face quar-

antine policies [CBinsights, 2021].

These achievements suggest that it is important for companies to consider business in the non-face-to-face field in response to increased online activity during the pandemic. Furthermore, from the point of view of research on consumers, it is very important to recognize the difference between pre-pandemic and pandemic period in increasing online activity in consumers' propensity to use online. This study verified the effects of consumer Innovativeness, need for cognition, and self-esteem on Internet activity and SNS activity during the 2021 pandemic compared to 2019, before the outbreak of COVID-19. In addition, we investigated whether privacy concerns showed a moderating effect between consumer propensity, Internet activity, and SNS activity.

2. Research Model

This study aims to identify the factors that affect the increase in online activity in a pandemic situation by analyzing the correlation between consumer Innovativeness, self-esteem, need for cognition, Internet activity, SNS activity, and privacy concern before and after the COVID-19 outbreak.



<Figure 1> Research Model

3. Research Hypothesis

3.1 Relationship between Consumer Innovativeness and Online Activity

Studies investigating SNS usage according to consumer innovativeness analyzed the effect of each of the four measures of consumer innovativeness. As a result of the study on the overall use of SNS, the higher the functional innovation, hedonic innovation, and social innovation, the easier it was to use SNS, while the higher the cognitive innovation, the lower the SNS use. The following hypotheses are proposed through a review of previous studies that have examined the effect of consumer innovativeness on the use of the Internet and SNS.

H1: Consumer innovativeness (functional/hedonic/social /cognitive innovation) will affect Internet activity.

H2: Consumer innovativeness (functional/hedonic/social /cognitive innovation) will affect SNS activity.

3.2 Relationship between Self-esteem and Online Activity

Self-esteem is used as a significant variable in explaining self-exposure to express one's thoughts, emotions, experiences, etc. to others, as well as Internet and SNS use behaviors and communication behaviors. Self-esteem is confirmed to have high explanatory power in explaining the behavior of people using the Internet, and through this, understanding of Internet activities can be improved. [Armstrong et al., 2000].

In a study by Krämer and Winter, it was found that people with low self-esteem were

relatively more likely to use the Internet than those with low self-esteem [Krämer and Winter, 2008]. In this regard, self-esteem is also used as a major variable in studies related to online media to examine the relationship between addiction and excessive use of control power. In a study on the factors affecting SNS addiction, it was confirmed that as a result of the study, individuals with high self-esteem had a negative effect on self-exposure, and SNS users with low self-esteem tried to expose themselves more through SNS.

As a result of the study on the effect of self-esteem on SNS use, individual self-esteem and the degree of SNS use showed a significant inverse relationship, and self-esteem in the psychological aspect had a negative effect on SNS use. In other words, it was confirmed that people with low self-esteem tended to use SNS more often than people with low self-esteem [Kim et al., 2020]. The following hypotheses are proposed through a review of previous studies that examined the effect of self-esteem on the use of the Internet and SNS.

H3: Self-esteem will affect Internet activity.

H4: Self-esteem will affect SNS activity.

3.3 Relationship between Need for Cognition and Online Activity

There are precedent studies that explored how the characteristics of need for cognition, as seen in the theoretical review, affect online media activities. In a study on the status of utilization and effects of reviews left online after watching a movie, the method of accessing reviews was analyzed according to the level of need for cognition. As a result of the study,

people with a high need for cognition tended to search for information using various channels related to movie viewing information before making a purchase. Research subjects classified as a group with high need for cognition analyzed movie information through online activities using various information sources such as movie-related homepages or webzines in order to search for rich information related to movies even if they use the Internet, starting with portal sites [Lee, 2009].

In terms of online activity, the group with high need for cognition showed higher online activity than the group without it in analyzing the movie before purchase using the movie viewing review. In a study that empirically demonstrated the factors that have a key influence on SNS use targeting senior consumers, it was found that need for cognition positively affect Internet activity and SNS activity. In other words, senior consumers with high need for cognition showed higher online activity than senior consumers with low need for cognition, which showed that the influence of need for cognition on online activity was greater compared to the non-senior consumer group [Kim, 2019].

In a study that classified online community user groups into active, external propagation, internal enthusiasm, and pure latent groups, it was demonstrated that those with higher need for cognition tended to belong to the active group according to the activity of four types of Internet usage on the Internet. The results of this study also support the research result that the higher the need for cognition, the higher the Internet activity, as in the previous research results [Hwang, 2020].

The following hypotheses are proposed based on previous studies examined through theoretical considerations on consumer pro-

pensity and online activity.

H5: Need for cognition will affect Internet activity.

H6: Need for cognition will affect SNS activity.

3.4 The Moderating Effect of Privacy Concerns

Privacy concern refers to the degree of concern about the possibility that personal information may be leaked or invaded against one's will [Westin, 1967].

In a recent study on privacy concerns, we can confirm the privacy paradox phenomenon in the online media environment where personal information is continuously provided or purchase experience and purchase frequency increase despite high privacy concerns. A study exploring the privacy paradox in the context of online purchases confirmed that the privacy paradox appears in the experience, frequency, and amount of money spent on online purchases. In addition, it has been demonstrated that a strong privacy paradox appears in online person-to-person transactions, especially in terms of experience and frequency [Lee et al., 2021; Hong, 2020].

Based on the review of these preceding studies, it was confirmed that privacy concerns had a significant moderating effect in the situation of purchasing products through online. Previous studies have examined the moderating effect of privacy concerns in online product purchase situations. In this study, we will examine whether there is a moderating effect of privacy concerns in online activities such as Internet community, Internet news, online participation, and online knowledge production. Consumer innovativeness can be de-

defined as the attitude or tendency to accept a new product before others when it appears, and it can be predicted that the higher the consumer innovativeness, the higher the information-seeking activity on the new product. Information seeking activities according to the degree of consumer innovativeness will use Internet communities, news, surveys, knowledge services, SNS, etc. as the main source of information acquisition. In the process of using these online media, personal information may be disclosed or traces may be left by providing information for membership registration or writing a post. Previous studies have confirmed the significance of the moderating effect of privacy concerns in the process of purchasing products online according to consumer Innovativeness. Considering that there is a moderating effect of privacy concerns, the following hypothesis is proposed.

- H7: The relationship between consumer innovativeness and Internet activity will differ depending on privacy concerns.
 H8: The relationship between consumer innovativeness and SNS activity will differ depending on privacy concerns.

In a study that analyzed the relationship between self-esteem and SNS use, focusing on the moderating effect of privacy concerns, it was found that people with higher self-esteem were more likely to belong to the SNS user group. Similarly, the higher the privacy concern, the higher the possibility of belonging to the SNS user group.

Most of the previous studies only looked at the main effects of self-esteem and privacy concerns on SNS use, and there were not many follow-up studies that analyzed interactions

such as moderating effects or mediating effects. In this study, we tried to find out the interaction between self-esteem and Internet and SNS use through the privacy moderating effect. In the process of using SNS, clues or traces that can infer personal information may be disclosed not only at the membership sign-up stage but also during the use process, writing posts or uploading photos and videos.

Despite the threat of personal information infringement, a study by Kim et al. [2020] shows that the higher the privacy concern, the more active SNS users belong to the group, and the higher the self-esteem. Contrary to the results of previous studies that found that the lower the self-esteem, the higher the use of SNS, the higher the self-esteem, the higher the use of SNS, when privacy concerns are put into the moderating effect. This study proposes the following hypotheses, considering that there will be a moderating effect on Internet activity and SNS activity through the moderating effect of privacy concern, which has been confirmed to be significant in the relationship between self-esteem and SNS use.

- H9: The relationship between self-esteem and Internet activity will differ according to privacy concerns.
 H10: The relationship between self-esteem and SNS activity will differ according to privacy concerns.

Looking at previous studies examining the moderating effect of privacy concern on the relationship between need for cognition and online activities, the group using SNS was divided into a non-use group, an income use group, and an active use group, and individual characteristics factors affecting the

degree of use were analyzed. The analyzed study investigated how cognitive needs and privacy interests affect the probability of using SNS. However, by setting need for cognition and privacy concerns as independent variables, it was not possible to confirm the relationship of direct mutual influence [Lee, 2017]. Due to the development of information and communication technology, various preceding studies related to concerns about invasion of privacy, such as concerns about leakage of personal information or tracking of location information, are being conducted. However, studies exploring the direct correlation between need for cognition and privacy concerns remain at an early stage. As a result of previous research [Mourali et al., 2005] showing the tendency to collect information from various information sources as the need for cognition is high, the high need for cognition that appears through active information collection activities has a positive (+) effect on web use. Based on previous research results [Jee and Lee, 2002; Tuten and Bosnjak, 2001], it seems that the higher the need for cognition, the more likely to accept the need to provide personal in-

formation in the process of using online media and actively seek information. Therefore, this study proposes the following hypotheses, considering that there will be a moderating effect of privacy concern in the relationship between need for cognition, Internet activity, and SNS activity.

H11: The relationship between need for cognition and Internet activity will differ according to privacy concerns.

H12: The relationship between need for cognition and SNS activity will differ depending on privacy concerns.

4. Methods

This study used data collected through the Korea Information Society Development Institute's 2019-2021 Korea Media Panel Survey, and the survey data used for research analysis was conducted using individual survey data provided by the media statistics portal site (<https://stat.kisdi.re.kr>) proceeded. This study was conducted with the same respondents to the Korean Media Panel Survey from 2019 to 2021.

<Table 1> Operational Definition of Factors

Factor		Operational Definition	Prior research
Consumer Innovativeness	Functional Innovation	A tendency to improve productivity and avoid risk, which is expressed when a product is perceived to be useful or practical in terms of functionality.	Midgley and Dowling [1978], Hirschman [1980], Agarwal and Prasad [1998], Foxall et al. [1998], Veryzer [1998], Rogers [2003], Vandecasteele and Geuens [2010]
	Hedonistic Innovation	The tendency to seek emotional value that satisfies personal pleasure and satisfaction with external stimuli, such as purchasing innovative products or accepting new aspects	
	Social Innovation	Willingness to accept innovation ahead of others to improve one's social value, image, influence, etc. in social relationships	
	Cognitive Innovation	The tendency to pursue new experiences that stimulate mental activities to acquire new knowledge and information, and to enhance cognitive understanding of objects or phenomena	

<Table 1> Operational Definition of Factors (Continued)

Factor	Operational Definition	Prior research
Self esteem	A person's tendency to feel overall about how much he or she values and likes himself	Dutton and Brown [1997], Baumeister [1993], Branden [1992], Coopersmith [1981]
Need for cognition	The tendency of an individual to enjoy thinking while immersed in a certain event or object, a tendency inherent in individuals who have a high interest in the process of searching for information and find pleasure in this activity	Cacioppo and Petty [1982], Haugtvedt et al. [1992], Thompson [1995], Murali et al. [2005]
Privacy concerns	Threats and concerns that users feel about the development of technology such as monitoring, storage, and retrieval in the process of handling personal information	Culnan [1993], Fishbein and Ajzen [1977], Grossklags and Acquisti [2007]
Internet activity	The degree of activity such as writing or commenting on Internet communities, online surveys, news/discussion boards, Internet knowledge services, etc.	Kaye and Johnson [2002], Swickert et al. [2002], Hill and Argyle [2003]
SNS activity	The degree to which activities such as writing posts directly on social media, uploading images, videos, etc., checking other people's posts, and leaving comments or likes	Nyland and Near [2007], Johnson and Yang [2009]

5. Research Analysis Results

In this study, three data from the Korea Media Panel Survey 2019-2021 were combined based on response ID and a total of 3222 responses were used for analysis, and the empirical analysis method was analyzed using the IBM SPSS statistics 23.0 program. Exploratory factor analysis was conducted to confirm the validity of the collected data, and reliability was confirmed through Cronbach's a coefficient. Regression analysis was conducted to find out how the independent variables of consumer innovativeness, self-esteem, and need for cognition affect the dependent variables of Internet activity and SNS use. The regression analysis method was used as a hierarchical regression analysis method to find out the moderating effect of privacy concern, a moderating variable. The regression model was designed so that the research variable set in this study could have a pure influence on the dependent variable by inputting the demographic factor showing the difference in average between groups for the dependent

variable, Internet activity and SNS use status, as a control variable.

5.1 Impact on Internet Activity before the COVID-19

As factors influencing Internet activity before the outbreak of COVID-19, hedonic innovation ($B=.065, t=6.005, p=.000$) and social innovation ($B=.027, t=2.149, p=.032$) in the main effects were found to have a statistically significant positive (+) effect on Internet activity.

Cognitive Innovation ($B=-.041, t=-3.248, p=.001$) was found to have a statistically significant negative (-) effect on Internet activity. As a result of analyzing the standardized regression coefficient (β), it was found that hedonic innovation ($\beta=.141$) had a greater impact on Internet activity than social innovation ($\beta=.059$). In the case of the moderating effect of privacy concern, as a result of the individual regression coefficient test, all interaction terms were found to be statistically insignificant at the significance level of 0.05, indicating that there was no moderating effect.

<Table 2> Regression Analysis of Main Effect and Moderating Effect on Internet Activity before COVID-19

Step/Variable	Before COVID-19 (2019)				
	B	SE	β	t	p
Step 1: Control variable (F: 10.72 ^{***} , R ² :.035)					
(a constant)	1.137	.024		46.941	.000 ^{***}
20's	.050	.034	.049	1.500	.134
30's	.122	.038	.097	3.223	.001 ^{***}
40's	.070	.034	.064	2.052	.040
50's	.005	.035	.004	.138	.890
60+	-0.54	.045	-.026	-1.195	.232
university graduation	.108	.021	.111	5.206	.000 ^{***}
Graduate school or higher	.074	.058	.024	1.292	.196
Less than 2 million won	-.015	.026	-.012	-.582	.560
Less than 2-3 million won	.023	.023	.022	.988	.323
Less than 3-4 million won	-.008	.028	-.006	-.281	.779
over 4 million won	.090	.034	.056	2.646	.008 ^{***}
Step 2: Main Effects (F: 12.83 ^{***} , R ² :.064)					
(a constant)	1.133	.024		46.555	.000 ^{***}
20's	.057	.033	.055	1.175	.086
30's	.140	.038	.112	3.712	.000 ^{***}
40's	.092	.034	.085	2.704	.007 ^{***}
50's	.040	.035	.033	1.133	.257
60+	-.008	.045	-.004	-.189	.850
university graduation	.097	.021	.100	4.703	.000 ^{***}
Graduate school or higher	.066	.057	.021	1.150	.250
Less than 2 million won	-.020	.025	-.016	-.804	.421
Less than 2-3 million won	.017	.023	.016	.720	.471
Less than 3-4 million won	-.019	.028	-.015	-.692	.489
over 4 million won	.063	.034	.039	1.877	.061
Functional innovation (A)	.014	.012	.031	1.171	.242
Hedonic innovation (B)	.065	.011	.141	6.005	.000 ^{***}
Social Innovation (C)	.027	.013	.059	2.149	.032 [*]
Cognitive Innovation (D)	-.041	.013	-.089	-3.248	.001 ^{***}
Self-Esteem (E)	.009	.009	.020	1.070	.285
Need for cognition (F)	.014	.009	.030	1.510	.131
Step 3: Interaction effect (F: 9.689 ^{***} , R ² :.068)					
(a constant)	1.136	.025		46.380	.000 ^{***}
20's	.059	.033	.057	1.754	.080
30's	.141	.038	.113	3.751	.000 ^{***}
40's	.089	.034	.082	2.618	.009 ^{**}
50's	.038	.035	.032	1.085	.278
60+	-.008	.045	-.004	-.169	.866
university graduation	.095	.021	.098	4.620	.000 ^{***}
Graduate school or higher	.059	.057	.019	1.030	.303
Less than 2 million won	-.024	.025	-.020	-.954	.340

<Table 2> Regression Analysis of Main Effect and Moderating Effect on Internet Activity before COVID-19 (Continued)

Step/Variable	Before COVID-19 (2019)				
	B	SE	β	t	p
Less than 2-3 million won	.017	.023	.016	.727	.467
Less than 3-4 million won	-.020	.028	-.015	-.708	.479
over 4 million won	.061	.034	.038	1.824	.068
Functional innovation (A)	.012	.012	.027	.994	.320
Hedonic innovation (B)	.063	.011	.137	5.845	.000***
Social Innovation (C)	.024	.013	.052	1.904	.057*
Cognitive Innovation (D)	-.039	.013	-.086	-3.133	.002**
Self-Esteem (E)	.009	.009	.019	1.020	.308
Need for cognition(F)	.016	.009	.034	1.736	.083
privacy concerns (G)	.025	.009	.055	2.913	.004**
AXG	-.009	.012	-.022	-0.769	.442
BXG	.004	.010	.010	.412	.681
CXG	-.004	.012	-.011	-.370	.711
DXG	.007	.013	.015	.507	.613
EXG	-.015	.008	-.034	-1.788	.074
FXG	.001	.008	.003	.134	.893

* p<.05, ** p<.01, *** p<.001.

5.2 Impact on Social Media Activity before COVID-19

Social innovation (B=.253, t=4.479, p=.000) and cognitive innovation (B=.118, t = 2.089, p = .037) was found to have a statistically significant positive (+) effect on SNS activity. Also, according to the standardized regression coefficient (β), social innovation (β =.119) had a greater impact on SNS activity than cognitive innovation (β =.056). In the case of the moderating effect of privacy concern, as a result of the individual regression coefficient test, all interaction terms were found to be statistically insignificant at the significance level of 0.05, indicating that there was no moderating effect.

In the case of the moderating effect of privacy concern, cognitive innovation (B=.118, t=2.107, p=.035) and privacy concern (B=.214, t= 5.534, p=.000), and the interaction term (B=.116, t=1.987, p=.047) were all found to have a statistically significant positive (+) effect at the significance level of .05, indicating a moderating effect. In the relationship between cognitive innovation and Internet activity, it was found that the increase in Internet activity according to the change in cognitive innovation was larger in the case where privacy concern was higher than in the case where privacy concern was low, and it can be interpreted that there is a strengthening effect of the moderating variable.

<Table 3> Regression Analysis of Main Effect and Moderating Effect on SNS Activity before COVID-19

Step/Variable	Before COVID-19 (2019)				
	B	SE	B	t	B
Step 1: Control variable (F: 28.997***, R ² :.090)					
(a constant)	4.426	.109		40.745	.000***
20's	-.262	.151	-.055	-1.737	.082
30's	-.457	.169	-.079	-2.706	.007**
40's	-1.325	.153	-.263	-8.634	.000***
50's	-1.454	.157	-.262	-9.259	.000***
60+	-1.745	.202	-.183	-8.649	.000***

<Table 3> Regression Analysis of Main Effect and Moderating Effect on SNS Activity before COVID-19 (Continued)

Step/Variable	Before COVID-19 (2019)				
	B	SE	B	t	B
university graduation	.280	.093	.062	3.021	.003**
Graduate school or higher	-.044	.259	-.003	-.172	.863
Less than 2 million won	.273	.115	.048	2.366	.018*
Less than 2-3 million won	.145	.105	.030	1.382	.167
Less than 3-4 million won	-.057	.127	-.010	-.452	.652
over 4 million won	-.051	.152	-.007	-.333	.739
Step 2: Main Effects (F: 23.075***, R ² :.109)					
(a constant)	4.448	.110		40.582	.000***
20's	-.322	.151	-.067	-2.135	.033*
30's	-.505	.170	-.087	-2.980	.003**
40's	-1.329	.154	-.264	-8.645	.000***
50's	-1.435	.158	-.258	-9.108	.000***
60+	-1.690	.202	-.177	-8.367	.000***
university graduation	.291	.093	.065	3.142	.002**
Graduate school or higher	.044	.257	.003	.173	.863
Less than 2 million won	.281	.114	.049	2.456	.014*
Less than 2-3 million won	.116	.104	.024	1.119	.263
Less than 3-4 million won	-.084	.127	-.014	-.662	.508
over 4 million won	-.077	.152	-.010	-.510	.610
Functional innovation (A)	-.042	.055	-.020	-.759	.448
Hedonic innovation (B)	-.047	.048	-.022	-.961	.337
Social Innovation (C)	.253	.057	.119	4.479	.000***
Cognitive Innovation (D)	.118	.056	.056	2.089	.037*
Self-Esteem (E)	-.055	.039	-.026	-1.413	.158
Need for cognition(F)	-.034	.040	-.016	-.852	.395
Step 3: Interaction effect (F: 12.998***, R ² :.089)					
(a constant)	4.474	.110		40.742	.000***
20's	-.298	.150	-.062	-1.987	.047
30's	-.475	.169	-.082	-2.811	.005**
40's	-1.325	.153	-.263	-8.653	.000***
50's	-1.434	.157	-.258	-9.138	.000***
60+	-1.679	.201	-.176	-8.354	.000***
university graduation	.274	.092	.061	2.968	.003**
Graduate school or higher	-.022	.256	-.001	-.084	.933
Less than 2 million won	.238	.114	.042	2.089	.037*
Less than 2-3 million won	.102	.104	.021	.981	.327
Less than 3-4 million won	-.091	.126	-.015	-.723	.470
over 4 million won	-.101	.151	-.014	-.667	.505
Functional innovation (A)	-.069	.055	-.033	-1.261	.208
Hedonic innovation (B)	-.065	.048	-.031	-1.343	.179
Social Innovation (C)	.239	.056	.113	4.233	.000***
Cognitive Innovation (D)	.118	.056	.056	2.107	.035*
Self-Esteem (E)	-.065	.039	-.031	-1.655	.098
Need for cognition(F)	-.017	.040	-.008	-.420	.675
privacy concerns (G)	.214	.039	.101	5.534	.000***
AXG	-.043	.053	-.023	-.801	.423
BXG	-.054	.043	-.029	-1.239	.215
CXG	-.044	.052	-.023	-.831	.406
DXG	.116	.058	.059	1.987	.047*
EXG	-.057	.038	-.028	-1.515	.130
FXG	.043	.037	.021	1.146	.252

*p<.05, **p<.01, ***p<.001.

5.3 Impact on Internet Activity after the COVID-19

As factors influencing Internet activity in 2021, the period after the outbreak of COVID-19, functional innovation (B=.037, t=2.709, p=.007) and hedonic innovation (B=.059, t = 4.870, p=.000), and need for cognition (B=.037, t=3.697, p=.000) were found to have a statistically significant positive (+) effect on Internet activity. Cognitive innovation (B=-.065, t=-4.666, p=.000) was shown to have a statistically significant negative (-) effect on Internet activity. In the case of the moderating effect of privacy concern, functional innovation (B = .036, t=2.679, p = .007) and privacy concern (B = .087, t=9.789, p=.000), and the interaction term (B = .044,

t=3.504, p=.000) were all found to have a statistically significant positive (+) effect at the significance level of 0.05, indicating a moderating effect. In the relationship between functional innovativeness and Internet activity, we find that the increase in Internet activity with a change in functional innovativeness is larger when privacy concerns are higher than when they are lower. This can be interpreted as a reinforcing effect of the moderating variable. Need for cognition (B = .041, t=4.098, p=.000), privacy concern (B = .087, t=9.789, p=.000), and interaction terms (B = .025, t=2.642, p = .008) were all found to have a statistically significant positive (+) effect at the significance level of 0.05, indicating a moderating effect.

<Table 4> Regression Analysis of Main Effect and Moderating Effect on Internet Activity after COVID-19

Step/Variable	After COVID-19 (2021)				
	B	SE	β	t	p
Step 1: Control variable (F: 6.258 ^{***} , R ² :.021)					
(a constant)	1.218	.027		45.020	.000 ^{***}
20's	.006	.038	.005	.156	.876
30's	.023	.042	.016	.542	.588
40's	.060	.038	.050	1.581	.114
50's	.021	.039	.016	.537	.5901
60+	-.043	.050	-.019	-.860	.390
university graduation	.121	.023	.112	5.236	.000 ^{***}
Graduate school or higher	.074	.064	.021	1.145	.252
Less than 2 million won	-.080	.029	-.058	-2.777	.006 ^{***}
Less than 2-3 million won	-.036	.026	-.031	-1.371	.170
Less than 3-4 million won	-.003	.032	-.002	-.100	.921
over 4 million won	.038	.038	.021	1.007	.314
Step 2: Main Effects (F: 9.701 ^{***} , R ² :.049)					
(a constant)	1.219	.027		44.866	.000 ^{***}
20's	.014	.037	.012	.378	.706
30's	.040	.042	.029	.954	.340
40's	.083	.038	.068	2.170	.030 [*]
50's	.056	.039	.042	1.443	.149
60+	.003	.050	.001	.061	.951
university graduation	.104	.023	.097	4.535	.000 ^{***}
Graduate school or higher	.055	.064	.016	.866	.387
Less than 2 million won	-.086	.028	-.062	-3.023	.003 ^{***}

<Table 4> Regression Analysis of Main Effect and Moderating Effect on Internet Activity after COVID-19 (Continued)

Step/Variable	After COVID-19 (2021)				
	B	SE	β	t	p
Less than 2-3 million won	-.045	.026	-.039	-1.763	0.78
Less than 3-4 million won	-.021	.031	-.015	-.676	.499
over 4 million won	.006	.038	.003	.152	.879
Functional innovation (A)	.037	.014	.073	2.709	.007**
Hedonic innovation (B)	.059	.012	.115	4.870	.000***
Social Innovation (C)	.026	.014	.051	1.861	.063
Cognitive Innovation (D)	-.065	.014	-.128	-4.666	.000***
Self-Esteem (E)	.007	.010	.014	.725	.468
Need for cognition(F)	.007	.010	.073	3.697	.000***
Step 3: Interaction effect (F: 12.998***, R ² :.089)					
(a constant)	1.224	.027		45.815	.000***
20's	.023	.037	.020	.620	.536
30's	.044	.041	.032	1.066	.287
40's	.087	.037	.072	2.325	.020*
50's	.058	.038	.043	1.505	.132
60+	.006	.049	.003	.127	.899
university graduation	.093	.023	.086	4.107	.000***
Graduate school or higher	.021	.063	.006	.339	.735
Less than 2 million won	-.090	.028	-0.65	-3.234	.001**
Less than 2-3 million won	-.046	.025	-.040	-1.811	.070
Less than 3-4 million won	-.015	.031	-.010	-.480	.631
over 4 million won	-.005	.037	-.003	-.147	.883
Functional innovation (A)	.036	.013	.071	2.679	.007**
Hedonic innovation (B)	.052	.012	.103	4.407	.000***
Social Innovation (C)	.024	.014	.048	1.775	.076
Cognitive Innovation (D)	-0.62	.014	-.121	-4.489	.000***
Self-Esteem (E)	-.002	.010	-.004	-.197	.844
Need for cognition(F)	.041	.010	.080	4.098	.000***
privacy concerns (G)	.087	.009	.170	9.759	.000***
AXG	.044	.012	.088	3.504	.000***
BXG	.002	.012	.004	.155	.877
CXG	-.011	.014	-.021	-.776	.438
DXG	.004	.013	.007	.287	.774
EXG	.005	.009	.009	.485	.628
FXG	.025	.009	.051	2.642	.008**

* p<.05, ** p<.01, *** p<.001.

5.4 Impact on Social Media Activity after COVID-19

As a factor influencing social media activity in 2021, the post-COVID-19 period, the main effect of cognitive need (B=.215, t=5.268, p=.000) has a statistically significant pos-

itive effect on social media activity. In the case of the moderating effect of privacy concern, need for cognition (B=.238, t=5.960, p=.000), privacy concern (B=.431, t=11.986, p=.000), and interaction term (B=.431, t=11.986, p=.000) =.115, t=3.015, p=.003) were all found to have a statistically significant pos-

itive (+) effect at the significance level of 0.05, and it was analyzed that there was a moderating effect. In the relationship between need for cognition and SNS activity, it was found that the case of high privacy

concern showed a larger increase in SNS activity according to the change in the need for cognition, and it can be interpreted that there is a strengthening effect of the moderating variable.

(Table 5) Regression Analysis of Main Effect and Moderating Effect on SNS Activity after COVID-19

Step/Variable	After COVID-19 (2021)				
	B	SE	β	t	p
Step 1: Control variable (F: 28.997 ^{***} , R ² :.090)					
(a constant)	4.229	.110		38.518	.000 ^{***}
20's	-.129	.145	-.027	-.891	.373
30's	-.456	.155	-.080	-2.947	.003 ^{**}
40's	-.970	.140	-.194	-6.914	.000 ^{***}
50's	-.873	.142	-.159	-6.138	.000 ^{***}
60+	-1.334	.192	-.141	-6.940	.000 ^{***}
university graduation	.396	.091	.089	4.341	.000 ^{***}
Graduate school or higher	.232	.257	.016	.903	.367
Less than 2 million won					
Less than 2-3 million won					
Less than 3-4 million won					
over 4 million won					
Step 2: Main Effects (F: 23.075 ^{***} , R ² :.109)					
(a constant)	4.280	.111		38.450	.000 ^{***}
20's	-.126	.146	-.027	-.864	.388
30's	-.479	.157	-.083	-3.051	.002 ^{**}
40's	-.960	.141	-.192	-6.782	.000 ^{***}
50's	-.861	.144	-.156	-5.988	.000 ^{***}
60+	-1.279	.193	-.135	-6.616	.000 ^{***}
university graduation	.316	.092	.071	3.434	.001 ^{**}
Graduate school or higher	.124	.258	.009	.479	.632
Less than 2 million won					
Less than 2-3 million won					
Less than 3-4 million won					
over 4 million won					
Functional innovation (A)	.008	.056	.004	.141	.888
Hedonic innovation (B)	.048	.049	.023	.976	.329
Social Innovation (C)	.063	.057	.030	1.093	.274
Cognitive Innovation (D)	-.010	.057	-.005	-.181	.857
Self-Esteem (E)	-.073	.040	-.035	-1.821	.069
Need for cognition(F)	.215	.041	.102	5.268	.000 ^{***}
Step 3: Interaction effect (F: 12.998 ^{***} , R ² :.089)					
(a constant)	4.342	.109		39.999	.000 ^{***}
20's	-.102	.142	-.021	-.718	.473
30's	-.467	.153	-.081	-3.057	.002 ^{**}
40's	-.970	.138	-.194	-7.044	.000 ^{***}

<Table 5> Regression Analysis of Main Effect and Moderating Effect on SNS Activity after COVID-19 (Continued)

Step/Variable	After COVID-19 (2021)				
	B	SE	β	t	p
50's	-.883	.140	-.160	-6.311	.000***
60+	-1.291	.188	-.137	-6.871	.000***
university graduation	.256	.090	.058	2.841	.005**
Graduate school or higher	-.025	.251	-.002	-.100	.920
Less than 2 million won					
Less than 2-3 million won					
Less than 3-4 million won					
over 4 million won					
Functional innovation (A)	-.002	.055	-.001	-.028	.978
Hedonic innovation (B)	.014	.048	.007	.301	.763
Social Innovation (C)	.050	.056	.024	.886	.376
Cognitive Innovation (D)	.024	.056	.012	.437	.662
Self-Esteem (E)	-.097	.039	-.046	-2.496	.013*
Need for cognition (F)	.238	.040	.113	5.960	.000***
privacy concerns (G)	.431	.036	.205	11.986	.000***
AXG	-.068	.051	-.033	-1.332	.183
BXG	-.174	.047	-.086	-3.680	.000***
CXG	.036	.055	.017	.645	.519
DXG	.172	.053	.082	3.237	.001**
EXG	-.075	.038	-.036	-1.956	.051
FXG	.115	.038	.057	3.015	.003**

*p<.05, **p<.01, ***p<.001

6. Conclusion

As a result of this study, the most distinctive difference when comparing before and after COVID-19 is that during COVID-19, the increase in Internet activity and SNS activity increases according to the positive (+) effect of need for cognition. In addition, it was found that the increase in Internet and SNS activity increased in the case of high privacy concern according to the positive (+) change in need for cognition. In the average difference in Internet and SNS activity before and after COVID-19, it was found that need for cognition had a positive (+) significant effect in the main effect, and need for cognition were positive (+) in the moderating effect for the

average difference in SNS activity was analyzed to have a positive effect. Need for cognition, which did not have a significant effect on Internet and SNS activity before COVID-19, appear as a factor that has a significant effect during the period of COVID-19, such as activity restrictions due to social distancing quarantine guidelines, work and learning, etc. The cause can be found in the acceleration of digital transformation in the field. In a situation where existing ways of daily life such as leisure, exercise, work, and study are restricted due to social distancing quarantine measures, individuals may have increased cognitive desire to explore new alternative ways. It is interpreted that the active use of online media as a source of in-

formation to explore these new alternatives may have served as a cause of increasing on-line activity during the COVID-19 period.

The digital transformation that affected society during the COVID-19 period centered on the use of online tools, accelerating the existing methods of interpersonal communication, collaboration, learning, and consumption into digitalization, and in this process, learning of online tools inevitably would have entailed. Even in the elderly, who have relatively low digital capabilities and acceptance, they would have had to learn at least how to use vaccine authentication using mobile in order to use essential living facilities during the social distancing period. In this way, during a pandemic such as COVID-19, people are restricted by quarantine measures and become more active on the Internet and SNS to seek new alternatives in a changed living environment. When companies inform and provide products and services to consumers during the pandemic, it is important to emphasize that their products and services can be a new alternative in a situation where the lifestyle of consumers is being restricted by quarantine measures. It can be seen as important, and it is necessary to diversify the media and means to provide information according to the characteristics of need for cognition that search for various information sources.

Functional innovation is also a major factor influencing the increase in Internet activity during COVID-19, emphasizing that it is useful and practical in terms of functionality when companies use Internet media to inform and provide products and services during COVID-19. It is necessary to emphasize that the focus on the usefulness and practicality of these Internet activities can be a new alter-

native in everyday life restricted by quarantine measures.

In addition, this study has academic significance in that it validates the effects of consumers' innovativeness, need for cognition, and self-esteem on Internet and SNS activities, as well as the moderating effect of privacy concerns on consumer orientation, Internet activity, and SNS activity.

One of the limitations of this study is that the data used for empirical analysis is secondary data, so the analysis could only be conducted within the scope of the survey questions already constructed. It is necessary to conduct a follow-up study to examine the influencing factors of SNS activeness by detailed services related to Internet activeness.

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