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The role of online news and social media in preventive action in times of infodemic from a social capital perspective: The case of the COVID-19 pandemic in South Korea

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\textbf{ABSTRACT}

Infodemic, the spread of false information during the COVID-19 pandemic, has been raised as one of the major concerns aggravating the confusion in the global society. In this regard, the role of media as an information channel in delivering the reliable information and motivating the active participation of citizens in complying with government’s preventive actions becomes much more important. In this study, the role of online news and social media on people’s preventive actions considering the role of trust in citizens and government from the perspective of social capital is investigated. For the empirical study, a structural equation modeling is employed by using survey material gathered from South Korea in the early days of the COVID-19 outbreak. South Korea was selected as its COVID-19 prevention strategy focused not only on the provision of medical support, but also on the enhancement of social trust through active engagement with people through media channels. Our results reveal that the perceived characteristics of online news and social media influence preventive actions through the trust in citizens or in government. In addition, while online news media enhances trust in both the citizens and the government, social media only influences trust in citizens. Based on our findings, the role of media in preventing the spread of COVID-19 is discussed.

1. Introduction

The advent of COVID-19 had a enroumous impact on the global community, for which none of our existing systems were prepared. Ever since the World Health Organization (WHO) announced the COVID-19 global pandemic, the new protocol has changed various aspects of our lives and, eventually, our way of living. Regarding the spread of the virus, the WHO raised a concern about the dissemination of “fake news.” Infodemic, a compound word of “information” and “pandemic” meaning the spread of wrong information in times of pandemic, can create an informatic confusion in society.

In the new media environment, also known as digital media environment based on information and communication technology (ICT), the news or even fake news easily spreads; thus, the role of media providing an accurate and timely information to the public

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becomes essential (Marin, 2020; Schillinger et al., 2020). Among all, online news and social media are the two representative media channels that are most frequently used in the new media environment. Online news media (ONM) refers to a set of Internet- or mobile-based web-pages or applications such as Naver, Daum in South Korea, Baidu, Qihoo 360, QQ in China, and Yahoo in Japan containing the list of news contents provided by the legacy media such as television news, newspaper, and so on (Im et al., 2011). Social media (SM) indicates a set of Internet- or mobile-based web-pages or applications, which allows the creation and exchange of user-generated content (Zolkepli and Kamarulzaman, 2015) such as Facebook, Instagram, Twitter, etc.

After the advent of SM, comparative studies on ONM (Fletcher and Park, 2017; Jang and Baek, 2019; Rochlin, 2017) have mainly been conducted from the perspective of the content producer, with a focus on structural characteristics. While the legacy media considers as a channel, delivering information to audiences, the Internet democratizes the means of content production, transforms subjects that create value and allows reciprocal interaction between content producers and consumers (Redden and Witsche, 2010). ONM expands its structure and accelerates the speed information spreading by hosting legacy media content on their portals (Wang et al., 2014). Meanwhile, SM reproduces the content hosted by ONM or produces new content directly through the actions of users (Yoo et al., 2019), which exponentially increases the rate of content production and spreading. Since users utilize such platforms to determine their own responses (Rainie and Wellman, 2012), the roles of ONM and SM are important factors that need investigation in this pandemic.

During a pandemic (or infodemic), the role of media demanded by society is providing an accurate and timely information about the disease so that citizens can respond and participate in preventive action. From a social capital theory’s perspective, media can enhance the social trust of society by reducing the uncertainty and fear brought by the infodemic. Social trust refers to a propensity of people in society to cooperate in order to produce socially efficient outcomes (Putnam, 1992). Compared to the one with lower social trust, a society with greater social trust requires a lower cost of cooperation and can promote collective actions with more voluntary participation of the community members (Nakagawa and Shaw, 2004). Not only as effective means for providing information, new media can enhance social trust by strengthening the social ties between citizens (Cho et al., 2013). In the new media environment, citizens can easily interact and share opinions with each other, and through such activities, they come to believe that they are safe and living in the trustworthy society. Thus, ONM and SM can motivate citizens to actively participate and follow the preventive action provided by the government guidelines.

In reality, in the early stage of COVID-19, people could get various news contents from different news providers and receive timely news contents from all over the world by using ONM and SM. Although both share many similarities as news platforms, there are a couple of differences. First, ONM only allows the approved news contents provided by the legacy media, while SM provides a wider range of sources that are not officially confirmed. Second, SM provides a personalized service, so that users can receive the news contents from the source that they prefer, while ONM provides the full list of news contents available. Due to these differences, the user’s perception and uses of ONM and SM can influence their behavior differently. Especially during the COVID-19 pandemic, when the uncertainty created by the unknown disease prevails, this can cause a serious problem as unified preventive action is needed to prevent the virus spreading. Thus, discovering the specific role of new media in the comparison between the two representative new media channels of ONM and SM can address how each media should be strategically operated in times of infodemic.

Several studies have explored the role of media during the COVID-19 pandemic (Apuke and Omar, 2021; Liu, 2020; Marin, 2020; Radu, 2020; Schillinger et al., 2020; Su, 2021). To the best of our knowledge, the effects of new media on preventive behavior through the social trust have not been discussed. Liu and Mesch (2020) pointed out the confidence in social institutions as one of the predictors of adopting preventive behaviors. In this sense, their model explained the relationship between media perception and preventive action using social trust as mediator. However, it has not been discussed whether such a relation differs between two most dominant media channel—ONM and SM.

In this regard, this study explores the effects of new media, including ONM and SM, during the COVID-19 pandemic and addresses following research questions. First, do the perceived characteristics of the media contribute to the enhancement of trust in citizens and in government? Second, does the trust in citizens and in government contribute to preventive actions? Lastly, is there a difference on the role of media between ONM and SM?

The following section illustrates the literature review supporting our hypothesis. Section 3 introduces the case study of the COVID-19 pandemic in South Korea. The research framework including the profile of respondents and the five constructs of the research model is described in Section 4, followed by an empirical analysis for assessing the measurement model, testing the hypotheses, and interpreting the results in Section 5. Section 6 discusses and concludes the paper by providing recommendations.

2. Literature review and hypothesis development

2.1. The influence of perceived characteristics of media upon preventive action in an infodemic

From the social science aspect, vast research was conducted to investigate the effect of media use on aggression (Anderson and Bushman, 2002), political behavior (Levendusky and Malhotra, 2016), social identity (Slater, 2007), public health (Schillinger et al., 2020), and so on. In addition, the role of media as an information channel during the pandemic was largely investigated (Marin, 2020; Schillinger et al., 2020; Su, 2021). Regarding the direct relation between media use and preventive action, the cognitive-behavioral theory of health explains that information consumption about diseases increases the concern about one’s health, which eventually leads to more preventive action to reduce risk (Hadjistavropoulos et al., 1998). In other words, providing greater information about COVID-19 can make people more concerned about the virus, and it motivates them to become more active in searching for related information and complying with prevention guidelines. In particular, it has been consistently confirmed that the emotions arising
during the pandemic have not only an indirect effect as antecedent variables stimulating motivations but also a direct effect on search and the processing behavior of information (Griffin et al., 2008).

Apparently, ONM is superior to other media channels in providing news content with large quantity and diversity. Liu (2020) showed that COVID-19-related information on ONM increases preventive practices. Thus, hypothesis 1 is offered:

H1. The more favorable a user perceives ONM, the more likely the person is to take preventive action in times of infodemic.

In a similar sense, the perceived characteristics of SM can increase preventive behavior through the mediation of one’s perceived concern. During the COVID-19 pandemic, more SM uses create overconcern about the situation (Farooq et al., 2020; Liu, 2020; Oh et al., 2021) and provides new space for the emotional interaction between users (Oh et al., 2014). In addition, Oh et al. (2021) found that SM use increases preventive behavior through self-relevant emotions (fear and anger) and public’s risk perception. Yoo et al. (2016) investigated individuals’ motivation to acquire information through SM increased during MERS (Middle East respiratory syndrome) outbreaks in South Korea, which has a positive effect on preventive behavior. In addition, it enhanced preventive actions to protect themselves and personal hygiene habits such as washing hands, using hand sanitizer, wearing facial masks, and refraining from using public transportation. This suggests that the individual emotions of SM users are important variables that can directly or indirectly influence behavior to reduce risk through communications between users (Neubaum et al., 2014). Thus, hypothesis 2 is offered:

H2. The more favorable a user perceives SM, the more likely the person is to take preventive action in times of infodemic.

2.2. The influence of perceived characteristics of media on social trust in an infodemic

In a pandemic situation, the role of media is to contribute to risk perception, which is socially constructed and can be interpreted in various ways depending on how individuals perceive the dangers of the disaster (Slovic, 1987). This is because individuals rely heavily on information provided by the media to recognize the pandemic situation. Moreover, the information provided by the media influences the formation of social capital and trust (Francois, 2002), which have an important role in managing the pandemic situation. In a pandemic, social trust becomes more important in that citizens need to actively cooperate in exercising social distancing, wearing facial masks, and so on.

Depending on the characteristics of media in a pandemic situation, the mechanism of social trust accumulation (Scheufele and Shah, 2000; Shah et al., 2001), and the ways of delivering information to the public (Althaus and Tewksbury, 2000) work differently. ONM is becoming the essential information source, not only with the newspaper, television and radio news but also, recently, with the spread of the Internet (Sundar and Nass, 2001); they allow readers to comment and discuss articles. Due to this participation, ONM conveys not only the facts but also citizens’ opinions and emotions related to the articles (Fletcher and Park, 2017). Based on this participation, citizens trust that ONM works in a way that benefits them. Despite the many differences with legacy media, ONM’s COVID-19-related information sources are similar to legacy media. The information from the government, continuously distributed to the public with many ONM, leads citizens to have trust in government. Thus, hypotheses H3a and H3b are offered:

H3a. The more favorable a user perceives ONM, the more likely the person is to trust government in times of infodemic.

H3b. The more favorable a user perceives ONM, the more likely the person is to trust citizens in times of infodemic.

Previous studies have explained the positive relationship between SM perceptions and trust in various ways, such as personal contact (Liss, 2011), access to detailed information (Valenzuela et al., 2009), geographical properties of virtual community (Blanchard and Horan, 1998), and attachment to information sharing (Chung et al., 2016). In a pandemic, SM plays a role not only as online media that diffuse information in real time, but also as media forming mutual beliefs through emotional interactions within online social relationships (Lu et al., 2021; Oh et al., 2021). It is also applied in case in disaster situations. Cho et al. (2013) analyzed the use of Twitter during the 2011 earthquake in Japan, during which many emotional tweets formed social ties. In the case of online government communication, SM enables a two-way communication with the public, actively conducting policy campaigns. In a situation of high complexity and uncertainty like a pandemic, the government’s direct communication with people conveys more accurate information and increases the government’s credibility (Park et al., 2015). For example, through SM, the government not only consistently conveys various information, the number of confirmed cases, and the stage of development of vaccines and treatments. Governments answer people’s questions, increasing their trust. Trust in government is also formed by releasing various sources of fake news spreading online; thus, hypotheses H4a and H4b are offered:

H4a. The more favorable a user perceives SM, the more likely the person is to trust citizens in times of infodemic.

H4b. The more favorable a user perceives SM, the more likely the person is to trust government in times of infodemic.

2.3. The influence of social trust on preventive action in an infodemic

During a pandemic, it is important that not only an individual but that the society as a whole follows the social norm that is designed to avoid the diffusion of disease because a single incautious person can worsen the spread of the virus in the whole society.
The active participation and cooperation of citizens are especially important in overcoming disasters such as the spread of infectious diseases (Baybay and Hindmarsh, 2019), and this can be achieved via the enforcement of social trust. In the sense that higher social trust leads to superior performance of institutions in a society (Fukuyama, 1995), greater social trust in citizens can induce the community members’ more active participation into the new social norm and in more preventive actions (Felletti and Paglieri, 2019).

Fortunately, social trust is strengthened in a pandemic; historically, once the whole society becomes vulnerable, and more individuals face difficulties, the social bond and trust become stronger, and collective action is promoted to overcome the pandemic. During the Ebola outbreak (Blair et al., 2017; Fischhoff et al., 2018), the trust in social institutions is positively associated with the willingness to comply with preventive behaviors. In the COVID-19 pandemic, a similar tendency was observed by relevant studies. Mileti and Peek (2000) found that social cohesion has a positive effect on risk perception and evacuation because the perception of risk depends on the intervention and reaction of individuals’ families and neighbors. Bargain and Aminjonov (2020) found that high-trust regions show low mobility compared to low-trust regions, and these mobility reduction, trust, and efficiency of policy stringency are positively associated with each other. Liu and Mesch (2020) suggested three predictors of confidence (social institutions, complacency, and self-efficacy) to adopt preventive behaviors in response to the COVID-19. Thus, we hypothesize that:

\[ H_5. \text{The stronger an individual trusts citizens, the more likely the person is to take preventive action in times of infodemic.} \]

During such times, the government manages and addresses all relevant regulations to prevent the diffusion of the virus. The problem is that trust in the community does not necessarily indicate trust in government; thus, even during a pandemic, people may not follow the government’s guidance if they think that the government is not operating properly. The trust in government can be defined as an evaluation of various government outputs, or the peoples’ evaluation of whether the government is operating well in response to their expectations (Hetherington, 1998). For example, during the MERS outbreak in 2015, social debates over the cause and responsibility were fierce (Jang and Baek, 2019). For this reason, the government, which failed to respond in the initial stage of the outbreak, fell into a vicious circle of people’s distrust (Hamzah et al., 2020). This is a separate issue from personal political orientation as the trust in government, which is key to effective risk and disaster communication (Liu and Mehta, 2020). Thus, we hypothesize that:

\[ H_6. \text{The stronger an individual trusts government, the more likely the person is to take preventive action in times of infodemic.} \]

**Fig. 1** presents the research model tested in this study. This model hypothesizes the perceived characteristics of ONM and SM to be determinants of trust in citizens and in government. Furthermore, the trust in citizens and the trust in government are hypothesized to be determinants of preventive action.

3. **COVID-19 in South Korea**

Although no place is completely safe from COVID-19, there are relatively advanced places in which the spread of virus is being kept under control in a better way. Among all, South Korea has been highly praised by the many media and global leaders for its well-beyond management of this natural disaster. **Fig. 2** compares the daily confirmed cases between South Korea and the rest of the countries between January and August 2020. We took the average COVID-19 daily cases in South Korea and compared them with the global average. The dotted lines indicate the time when our survey was conducted (March 9–12, 2020). During the early period of COVID-19, South Korea’s daily cases were above the global average; however, this reflects not only the early start of COVID-19 in South Korea but also its capability of conducting between 15,000 and 20,000 daily test in March 2020 (Kim et al., 2020) —a number...
higher than that of China and even four times greater than that of Japan during the same period. With its quick and immediate response to COVID-19, South Korea could successfully suppress the virus diffusion and controlled its cases, while the average daily cases of the global community continuously rose.

Moreover, in a comparison with other countries, South Korea shows a comparably better management of COVID-19. In Fig. 3, the average confirmed cases between April 9 and May 12 (which includes the period between a month before our survey period to the last day) are log-transformed and illustrated by the color difference. It must be noted that some of the countries did not have enough capability or resources for COVID-19 tests, which indicates that low number of cases do not necessarily mean that such a country has controlled the virus well. Considering South Korea’s outstanding capability for conducting COVID-19 tests in both quantity and accuracy, therefore, this shows that the low number of cases reflects its competitiveness for preventing the spread of the virus.

Fig. 2. Confirmed COVID-19 daily cases (South Korea and average of other countries). Note. Author’s calculation using data retrieved from Johns Hopkins University Center for Systems Science and Engineering (JHU CCSE) Coronavirus website. The dotted line indicates the days in which our survey was conducted.

Fig. 3. Map of confirmed COVID-19 cases between April 9 and May 12. Note. Author’s calculation using data retrieved from Johns Hopkins University Center for Systems Science and Engineering (JHU CCSE) Coronavirus website.

1 https://systems.jhu.edu/research/public-health/ncov/
South Korea’s COVID-19 response and its success in preventing the spread of the virus eventually led to the adoption of similar strategies in other parts of the world (You, 2020). Three principles describe South Korea’s COVID-19 response strategy (Kim et al., 2020; Lee et al., 2020): openness, transparency, and democracy. First, they provide all collected and available data to the public without hiding any information; especially in times of high uncertainty, openness could contribute to reducing concerns. Second, not only the result but also the whole decision-making process should be transparent. Basically, both openness and transparency imply the importance of sharing accurate and reliable information. South Korea, one of the top leading countries in ICT and services, has used its rich human resources and infrastructures to help the local government and also the public for monitoring real-time information about tests, infections, infection routes, and so on. Apparently, South Korea has been actively engaged in both detecting the virus and providing relevant information to the public, which has avoided unnecessary confusion and debates. Third, as a response to the government’s effort in providing the high quality of services, Korean citizens strictly followed the government’s guidelines of social distancing, quarantine activities, wearing masks, and so on. They have shown that these viral threats can be controlled with a careful and compliant attitude of citizens without any action by the government to regulate national and international borders. As an outcome, they could hold big national events such as local elections and scholastic aptitude tests successfully.

In sum, information is a key pillar of South Korea’s COVID-19 response strategy (Kim et al., 2020). Apart from its own cultural or national characteristics, from a social capital theory perspective, this could also be understood as a reflection of social trust on the government and on relevant institutions. Especially in such chaotic times that no one has experienced before, the role of information becomes much more important. In this regard, the case of COVID-19 in South Korea is selected to explore how media’s role as an information channel contributes to enhancing social trust and preventive practices.

4. Data and research model

4.1. Sample and procedure

The survey material used for empirical analysis is the media issue survey (the second issue of its sixth volume) called “COVID-19-related information usage and awareness survey data”2 provided by the Korea Press Foundation. Under the purpose of investigating the use of information and awareness of the ongoing situation, all related to COVID-19, the survey was conducted between March 9 and 12, 2020 with 1000 respondents (see Table 1). This is when cumulative COVID-19 cases in South Korea increased from 7,382 to 7,869 and the World Health Organization (WHO) officially announced a global pandemic. This survey was timely conducted regarding the issue of COVID-19 and contained the related questionnaires that explain the key concepts of this study.

The survey questionnaires consist of confirming through which media Koreans access information on COVID-19 as well as the users’ perceptions in media, which are divided into (1) legacy media such as newspapers, terrestrial television, news channel, and radio; (2) ONM such as web portal sites (Naver, Daum) and news websites; (3) SM such as social networking service, messenger, online video platform, blogs, and online communities. In addition, the survey includes not only users’ opinions on the reliable, urgent, accurate, detailed, and useful degrees in each media but also perceptions of the seriousness of COVID-19, the appropriateness of the disease control authorities’ and members of society’s response, and the belief in the practice of preventive actions. The items were measured through a four-point Likert scale ranging from 1 (“Strongly Disagree”) to 4 (“Strongly Agree”).

4.2. Definitions and measurements of variables

4.2.1. Perceived characteristics of ONM

ONM refers to online journalism where editorial content is distributed via the web- or mobile-based platforms in combination with text, audio, video, or interactive forms (Franklin, 2014; Im et al., 2011). Such online news is produced directly by ONM, in combination with or with inputs from legacy media. Therefore, ONM is subject to the same legal regulations and detailed reporting guidelines for pandemic situations that are applicable for legacy media (Sundar and Nass, 2001). Consequently, ONM has a duty to provide accurate and prompt reports on COVID-19, as per the Korean Journalists Association’s Reporting Rules of COVID-19. Another characteristic of ONM is that it often involves interaction between readers through comments (King, 1998; Ruiz et al., 2011). This interaction between users bestows ONM with an air of reliability, and is perceived as an accurate, reliable, and timely source of COVID-19-related information. ONM, therefore, plays an important role in delivering reliable and useful information that is indispensable for preventive practices (Liu, 2020; Marin, 2020; Schillinger et al., 2020). Regarding this, the items include the following: (1) ONM provides reliable information, (2) ONM provides accurate information, (3) ONM provides detailed information, and (4) ONM provides useful information.

4.2.2. Perceived characteristics of SM

SM refers to interactive platforms that facilitate the dissemination of user-generated content or the sharing of other content through virtual communities or networks (Zolkepli and Kamarulzaman, 2015). Along with directed communication with individual friends, SM includes undirected communication such as passive consumption of social news and dissemination of information (Xie, 2014). In addition, because the information is produced under the control of decentralized users in the SM rather than the hierarchical

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2 Authors accessed the survey data the Korea Press Foundation website retrieved from https://kpf.or.kr/front/board/boardContentsView.do?board_id=2922&contents_id=5a07a292cc9437d8aca6194908c2b0
organization in the legacy media, SM transmits the information faster than legacy media. In particular, the transmission of information through SM is even faster than usual in disastrous situations (Song et al., 2015). SM is also characterized by no limitation of time and space, contrary to other news media. Because of this characteristic, information can be sufficiently delivered to the users by SM. The recognition of this sufficiency arises from the difference between the information that the user demands and the information that the user actually has. This sufficiency enables the user to process information more heuristically or systematically (Kahlor et al., 2003). This characteristic makes the SM recognize that it provides relatively detailed information promptly. Regarding this, the items include the following: (1) SM provides prompt information, (2) SM provides accurate information, (3) SM provides detailed information, and (4) SM provides useful information.

4.2.3. Trust in citizens

Trust is defined as people’s attitude of honesty, benevolence, integrity, and reliability toward other parties such as community members and citizens (McKnight and Chervany, 2000). A generalized trust is not from individuals’ rational calculations, but it is based on the generalized norm of reciprocity, such as the belief in the goodwill of ordinary people (Abbott and Freeth, 2008; Valenzuela et al., 2009). In addition, since trust forms a recursive relationship with group participation, it can influence one’s willingness to enable group activities (Langston and Barrett, 2008); therefore, trust in citizens allows for an open and inclusive approach to civic and community involvement, enabling cooperative action and a higher tendency to participate in collective action (Dudwick et al., 2006; Felletti and Paglieri, 2019). In other words, trust in citizens enables them to cope with the COVID-19 pandemic efficiently, which affects the psychological stability of community members (Liu and Mesch, 2020). Regarding this, the items include (1) the belief that citizens have responded appropriately and (2) that the confirmed and suspected patients have responded appropriately.

4.2.4. Trust in government

Trust in government can be analyzed by determining which government agency is trusted, and research has found a difference between the central and local government (Liu and Raine, 2016; Nicholls and Picou, 2013). Such agencies can be further subdivided into central government, local governments, and government-affiliated medical institutions in South Korea’s response to COVID-19. The roles of the central and local governments are clearly separated; the central government creates a quarantine system throughout the country, and the local governments direct in the field, such as through detailed management of social distancing (You, 2020). In addition, government-affiliated medical institutions are the mainstays of COVID-19 response and can also be included in the government’s trust. For example, the national medical center, the Armed Forces Capital Hospital, the Seoul Medical Center, and each national university hospital played a pivotal role in the treatment of COVID-19. Regarding this, the items include the following: (1) the central government is responding appropriately to COVID-19, (2) the local governments are responding appropriately to COVID-19, and (3) the medical institutions are responding appropriately to COVID-19.

4.2.5. Preventive action

During the early stage of the pandemic, an individual’s preventive action is essential as it is the only way to protect oneself from a virus for which neither a treatment nor a vaccination has been developed (Shahnazi et al., 2020; Ye et al., 2020). For instance, keeping social distance is strongly recommended in all countries, and its effectiveness has already widely observed from the many different cases. In this regard, a higher COVID-19 prevention stage indicates stronger restrictions and social distancing. Theoretically, preventive action has been used as the dependent variable of the Health Belief Model (Alsulaiman and Rentner, 2018; Shahnazi et al., 2020; Ye et al., 2020). This study uses prevention action as an indicator of an individual’s behavior related to COVID-19. Also known as avoidant behavior (Liu and Mesch, 2020), preventive action refers to the degree of an individual’s behaviors to prevent COVID-19 infection. Regarding this, the items include the following: (1) the belief that I am responding well, (2) acquisition of COVID-19-related information, and (3) following preventive behavior rules.

Table 1
Respondents’ demographic profile.

| Demographic Profile | Frequency | Percent |
|---------------------|-----------|---------|
| Gender              |           |         |
| Male                | 510       | 51.00%  |
| Female              | 490       | 49.00%  |
| Age                 |           |         |
| 20–30 years old     | 183       | 18.30%  |
| 30–40 years old     | 189       | 18.90%  |
| 40–50 years old     | 224       | 22.40%  |
| 50–60 years old     | 235       | 23.50%  |
| 60+ years old       | 169       | 16.90%  |
| Income              |           |         |
| <200 Mil Won        | 97        | 9.70%   |
| 200–300 Mil Won     | 178       | 17.80%  |
| 300–400 Mil won     | 198       | 19.80%  |
| 400–500 Mil won     | 176       | 17.60%  |
| 500–600 Mil won     | 109       | 10.90%  |
| 600–700 Mil won     | 97        | 9.70%   |
| 700–800 Mil won     | 53        | 5.30%   |
| >800 Mil won        | 92        | 9.20%   |
5. Empirical analysis

According to Hair et al. (2016), structural equation modeling (SEM), which is a theory-based multivariate analytical technique for identifying the comprehensive causal relationship, is divided into covariance-based SEM (CB-SEM) and partial least squares SEM (PLS-SEM). CB-SEM is primarily designed for confirming (or rejecting) a theory, such as a set of systematic relationships between multiple variables that can be empirically verified (Astrachan et al., 2014; Henseler et al., 2015). On the other hand, PLS-SEM focuses on the contribution of predictive model evaluation in exploratory studies and in particular, the variance explained in the dependent variable suitable for yielding better outcomes from large samples (Hair et al., 2017); therefore, the present study chooses CB-SEM by SPSS 23 and SPSS-AMOS 23 for evaluating the research model.

5.1. Descriptive analysis

In order to test the eight constructed hypotheses, the five variables were defined from the literature, as shown in Section 3. A total of 16 items that can explain the developed constructs are extracted to compose the conceptual model, including the perceived characteristics of ONM (four items), the perceived characteristics of SM (four items), the trust in citizens (two items), the trust in government (three items), and preventive action (three items). Based on the selected items, 229 samples were deemed incomplete (i.e., no responses in ONM or SM perceptions); thus, the data from 771 respondents were used for the final analysis. Table 2 presents actually used survey items and the results of constructs’ descriptive statistics in the conceptual model applied in this study.

5.2. Measurement model assessment

An exploratory factor analysis (EFA) is also a statistical approach used to examine internal reliability. In addition, EFA tests construct validity and extracts the new factor structure. Five constructs using a ML with promax of oblique rotation methods were extracted, as shown in Table 3. Kaiser–Meyer–Olkin’s (KMO) is 0.811, which is meritorious to verify the sampling adequacy. Bartlett’s test of sphericity is 0.000 ($\chi^2 (120) = 4734.925$), which indicates that significant correlations between items verified the suitability of EFA.

The internal consistency reliability of the scale using Cronbach’s alpha coefficient was assessed. Scales of Cronbach’s alpha in PCONM, PCSM, and TG were over 0.7; however, the others were over 0.5. Internal consistency measured by Cronbach’s alpha is the scale of reliability in each construct, and the values of TC and PA were said to be poor but not necessarily unacceptable (Dall’Oglio et al., 2010). In addition, according to Hinton et al. (2014), since a cutoff value in the range of 0.5–0.7 reflects moderate reliability, it can be considered acceptable. Since Cronbach’s alpha measures the amount of unique and common item variance, we cannot rely only on the traditional reliability coefficient in multidimensional scales (Lee et al., 2005). At the same time, there has been criticism that the reliability coefficient is the lower bound value, which tends to underestimate “true” reliability (Peterson and Kim, 2013; Taber, 2018). As an alternative to this, Hair et al. (2006) proposed the use of composite reliability (CR) in SEM as its values were slightly greater than the traditional coefficient alpha; therefore, this study used a criterion of CR for measuring internal consistency for construct reliability.

Confirmatory factor analysis (CFA) was employed to confirm the structure of constructs involved in the measurement model by

| Table 2 |
| --- |
| The constructs’ descriptive statistics and reliability. |
| **Constructs** | **Items** | **Mean** | **SD** | **Skewness (SE = 0.08B)** | **Kurtosis (SE = 0.176)** |
| Perceived Characteristics of ONM (PCONM) | ONM provides reliable information regarding COVID-19 | 3.02 | 0.73 | −0.523 | 0.288 |
| | ONM provides accurate information regarding COVID-19 | 3.04 | 0.73 | −0.414 | −0.077 |
| | ONM provides detailed information regarding COVID-19 | 3.06 | 0.77 | −0.517 | −0.076 |
| | ONM provides useful information regarding COVID-19 | 3.19 | 0.72 | −0.635 | 0.305 |
| Perceived Characteristics of SM (PCSM) | SM provides prompt information regarding COVID-19 | 2.70 | 0.78 | −0.071 | −0.469 |
| | SM provides detailed information regarding COVID-19 | 2.44 | 0.74 | 0.132 | −0.279 |
| | SM provides reliable information regarding COVID-19 | 2.40 | 0.78 | 0.145 | −0.365 |
| | SM provides accurate information regarding COVID-19 | 2.57 | 0.79 | −0.033 | −0.423 |
| Trust in Citizens (TC) | I think that citizens have responded appropriately to the COVID-19 | 2.96 | 0.61 | −0.368 | 0.904 |
| | I think that the confirmed and suspected patients have responded appropriately to the COVID-19 | 2.57 | 0.81 | −0.040 | −0.502 |
| Trust in Government (TG) | I think that the central government has responded appropriately to the COVID-19 | 2.97 | 0.94 | −0.607 | −0.514 |
| | I think that the local governments have responded appropriately to the COVID-19 | 2.96 | 0.79 | −0.540 | 0.041 |
| | I think that the medical institutes have responded appropriately to the COVID-19 | 3.37 | 0.66 | −0.848 | 0.736 |
| Preventive Action (PA) | I think that I have responded appropriately to the COVID-19 | 3.30 | 0.58 | −0.314 | 0.294 |
| | I try to get as much information as possible related to COVID-19 | 3.20 | 0.67 | −0.438 | −0.069 |
| | I try to keep the preventive actions related to COVID-19 (hand washing, wearing masks, and refraining from going to multi-use facilities) | 3.66 | 0.51 | −1.083 | 0.020 |
assessing the convergent and discriminant validity of the scales using CR and average variance extracted (AVE) (Hair et al., 2006). CR and AVE values are consistently greater than the threshold values of 0.70 and 0.50, respectively, which is acceptable (Fornell and Larcker, 1981). Furthermore, the estimated AVEs in off-diagonal elements were much higher than all the squared correlation with other constructs, which suggests that discriminant validity is established (Bove et al., 2009). Table 4 shows the Cronbach’s alpha and CR, AVE values, and inter-item correlation coefficient.

Several goodness-of-fit indices were evaluated to validate the CFA model. The results of CFA in the measurement model suggested a suitable model fit: $\chi^2(df = 94) = 444.672, \chi^2/df = 4.731, p = 0.000, CFI = 0.925, IFI = 0.925, TLI = 0.904, GFI = 0.932, AGFI = 0.902, SRMR = 0.057$, and $RMSEA = 0.070$ [LO 0.063, HI 0.076]. The chi-square statistics indicate that the model is not excellent but acceptable within limit of five or less (Marsh and Hocevar, 1985). However, the previous studies (Schermelleh-Engel et al., 2003; Vandenberg, 2006) explained that the chi-square statistic is no longer relied on as a criterion for acceptance or rejection because the chi-square test is very sensitive to sample size.

### 5.3. Hypotheses results

The analysis of the structural model was tested using the ML with SPSS-AMOS 23 by assessing the hypothesized relationships. PCONM and PCSM did not affect PA directly and significantly; therefore, H1 and H2 were not supported. On the other hand, both PCONM ($\beta = 0.098, p < 0.05$) and PCSM ($\beta = 0.108, p < 0.05$) have a positive and significant impact on TC, thus supporting H3a and H4a. In addition, PCONM ($\beta = 0.068, p < 0.01$) has a positively significant impact on TG, thus supporting H3b; however, H4b is not supported. Both TG ($\beta = 0.185, p < 0.01$) and PCONM ($\beta = 0.349, p < 0.001$) positively and significantly affect PA; thereby, H5 and H6 are supported. Table 5 reveals the hypothesis testing results.

The results suggested that PCONM and PCSM have no effect on PA directly. However, PCONM has significant effect on TC and TG, and both further have a significant effect on PA. Therefore, although PCONM has no direct effect on PA, we identify the role of TC and TG in examining the indirect impact of PCONM on PA. In addition, since PCSM only has a significant effect on TC and not on TG, it turns out that PCSM has an indirect effect on PA through the role of TC. Thus, media have no direct effect on PA and indirectly influence it through the TC or TG.

### 6. Discussion and conclusion

The advent of COVID-19 not only shocked the world with its fast spread and high mortality, but it also brought chaos with respect to the uncertainty and lack of information on the new virus. Especially during such a chaotic period, when very limited information is

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**Table 3**

| Components | 1 | 2 | 3 | 4 | 5 |
|------------|---|---|---|---|---|
| PCONM1     | 0.880 | −0.062 | −0.007 | 0.032 | −0.014 |
| PCONM 2    | 0.856 | 0.008 | −0.008 | −0.076 | 0.006 |
| PCONM 3    | 0.706 | 0.052 | −0.027 | 0.006 | 0.066 |
| PCONM 4    | 0.776 | 0.000 | 0.026 | 0.087 | −0.036 |
| PCSM1      | −0.060 | 0.752 | −0.023 | 0.063 | −0.013 |
| PCSM 2     | 0.105 | 0.734 | −0.019 | −0.044 | 0.075 |
| PCSM 3     | −0.046 | 0.840 | −0.003 | −0.028 | 0.047 |
| PCSM 4     | 0.017 | 0.806 | 0.042 | 0.064 | −0.090 |
| TC1        | −0.015 | −0.013 | −0.084 | 0.013 | 0.824 |
| TC2        | 0.065 | 0.052 | 0.183 | −0.140 | 0.483 |
| TG1        | −0.052 | −0.014 | 0.812 | −0.031 | −0.066 |
| TG2        | 0.053 | 0.038 | 0.842 | −0.013 | 0.010 |
| TG3        | −0.044 | −0.083 | 0.375 | 0.183 | 0.214 |
| PA1        | −0.031 | −0.004 | −0.024 | 0.533 | 0.247 |
| PA2        | 0.044 | 0.125 | −0.012 | 0.428 | −0.059 |
| PA3        | 0.034 | −0.024 | 0.020 | 0.700 | −0.136 |

Note: Rotation converged in six iterations.

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**Table 4**

Reliability and correlation matrix for convergent and discriminant validity.

|         | $\alpha$ | CR | AVE | PCONM | PCSM | TC | TG | PA |
|---------|----------|----|-----|-------|------|----|----|----|
| PCONM   | 0.881    | 0.932 | 0.775 | 0.880 |      |    |    |    |
| PCSM    | 0.865    | 0.915 | 0.729 | 0.500 | 0.854 |    |    |    |
| TC      | 0.555    | 0.725 | 0.568 | 0.243 | 0.231 | 0.754 |    |    |
| TG      | 0.735    | 0.836 | 0.640 | 0.111 | 0.009 | 0.520 | 0.800 |    |
| PA      | 0.548    | 0.787 | 0.559 | 0.204 | 0.096 | 0.374 | 0.261 | 0.747 |

Note: $\alpha =$ Cronbach’s alpha; CR = composite reliability; AVE = average variance extracted.
In this regard, it is recommended to provide officially proved information regarding diseases to SM users at least during a pandemic. Our results, however, do not support the fact that SM contributes to the trust in government. At this point, where the effects of ONM and SM are differentiated, we insist that this may be due to the distinct difference between the two sources of news contents. Both ONM and SM share many characteristics in common because they are operated as platforms. The problem is that, in SM, any information can right or wrong, SM strengthens the belief of people on how their friends and surrounding people are acknowledging the incident; as the advantage of SM. Since ONM provides news contents that are at least approved by the legacy media, this may be better than irrelevant information. The fact that more diverse and prompter information can be shared via the channel by anyone may be regarded be shared without any restriction; more importantly, users adopt information selectively from what they are only interested in or select highlighted as the significant difference from SM. By providing various news contents generated by the legacy media, ONM could have reliability depend on whether the news is provided from the main-stream news provider or not (Fletcher and Park, 2017), which can be known, the demand of a prompt and reliable information is high. The role of media, therefore, becomes much important, and the contribution of new media based on the ICT is especially highly esteemed. This study examines and compares the effects of the perceived characteristics of ONM and SM on the trust in citizens and in government as well as COVID-19 prevention during the global pandemic; it takes the case of South Korea, where COVID-19 was well managed in the early stage compared to other countries, as an example. Findings of this study highlight the role of media in reducing uncertainty and enhancing social trust in times of infodemic, addressing practical implications for the two rising media channels of ONM and SM.

In terms of strengthening preventive actions toward COVID-19, the trust in both citizens and government plays a significant role. To prevent COVID-19, it is important that not only an individual but also all members of society follow the established norms. Since COVID-19 can be spread unexpectedly in any possible situation, it is highly recommended that each single individual be responsible; otherwise, irresponsible behavior could endanger the whole society. In this regard, the greater trust in citizens assures people that their preventive actions are meaningful as other members of community are much more cautious in preventing the virus. Moreover, people’s trust in government induce people to follow its guidance, which eventually leads to more preventive action. Such a similar tendency was also observed in the work of Sibley et al. (2020), in which, during the lockdown and the pandemic, people show higher trust and patriotism compared to the pre-lockdown and pre-pandemic situation. This aligns with the social capital theory that greater trust in society enforces community networks and generates higher civil participation (Putnam, 1995). While the social capital was mostly thought of as emerging from offline face-to-face relationships (Putnam, 1995; Fukuyama, 1995), this study confirms that social capital can also emerge from online interactions and relationships (Valenzuela et al., 2009); this can contribute to bolstering preventive action in times of a global pandemic.

In addition, our result highlights the significant role of ONM in the enhancement of both trust in citizens and government institutes. In the Korean society, ONM is one of the fastest growing and most widely used media channels. As a news platform, ONM allows users to access diverse news generated by the legacy media all at once in both web and mobile environments. News consumption and reliability depend on whether the news is provided from the main-stream news provider or not (Fletcher and Park, 2017), which can be highlighted as the significant difference from SM. By providing various news contents generated by the legacy media, ONM could have a competitive advantage in the accessibility and diversity of news sources. Our result highlights the role of ONM as a reliable media channel providing prompt and diverse contents, especially in times of infodemic. With its advantage as a platform, ONM can fulfill the need for new information; moreover, it can contribute to lowering uncertainty and building a more trustworthy society.

SM also contributes to the enhancement of trust in citizens; this is the echo chamber effect, by which users tend to share similar opinions on certain topics with people with whom they are mainly communicating. In other words, regardless of whether the news is right or wrong, SM strengthens the belief of people on how their friends and surrounding people are acknowledging the incident; furthermore, they make people think that the groups in their community respond properly. In this regard, such a tendency created among SM users can help people feel less uncertain and assure that they are living in a trustworthy community in times of uncertainty.

Our results, however, do not support the fact that SM contributes to the trust in government. At this point, where the effects of ONM and SM are differentiated, we insist that this may be due to the distinct difference between the two sources of news contents. Both ONM and SM share many characteristics in common because they are operated as platforms. The problem is that, in SM, any information can be shared without any restriction; more importantly, users adopt information selectively from what they are only interested in or select themselves. This allows users to access new information that was not provided neither through legacy media nor ONM and to filter out irrelevant information. The fact that more diverse and prompter information can be shared via the channel by anyone may be regarded as the advantage of SM. Since ONM provides news contents that are at least approved by the legacy media, this may be better than ONM in terms of information quantity, but the problem is that information provided by SM is neither approved nor confirmed. Considering the quality of news contents provided by SM, this indicates that SM can lead to rumors based on misinformation and distrust in the government’s guidelines.

In this regard, it is recommended to provide officially proved information regarding diseases to SM users at least during a pandemic. As pointed out, SM allows diverse news contents, and this mixture of correct and incorrect information does not help build the trust in government regardless of its effort. Due to the nature of SM, controlling the media contents shared in the network should be prohibited; instead, providing only selected and approved news contents for SM users to have the opportunity to check the information can be an alternative solution. This has already been recognized by many experts, and many attempts were made to solve this issue; however, additional efforts to reduce the impact of misinformation are still needed (Lovari, 2020). As pointed out by Farooq et al. (2020), SM usage during COVID-19 can lead to information overload and the overconcern of users, and reducing such individual response cost can

### Table 5
Path coefficients, their significance, and hypothesis results.

| Hypothesized path | Estimate | Std. error | Critical ratio | Results |
|-------------------|----------|------------|----------------|---------|
| H1 PCONM → PA     |          |            |                | Not supported |
| H2 PCSM → PA      |          |            |                | Not supported |
| H3a PCONM → TC    | 0.098 *  | 0.042      | 2.348          | Supported |
| H3b PCONM → TG    | 0.068 *  | 0.025      | 2.677          | Supported |
| H4a PCSM → TC     | 0.108 *  | 0.054      | 1.994          | Supported |
| H4b PCSM → TG     |          |            |                | Not supported |
| H5 TC → PA        | 0.349 ***| 0.076      | 4.619          | Supported |
| H6 TG → PA        | 0.185 ** | 0.067      | 2.771          | Supported |

Note: * p < 0.05; ** p < 0.01; *** p < 0.001.
help motivate people to follow health measures. In this regard, at least for news contents related to the pandemic, we expect that bringing balance of news contents in SM can reduce confusion and increase trust in government.

This study has several limitations. First, the data used for analysis were secondary data taken from survey questionnaires that were not designed for the purpose of this study. While this led to some reductions in the sample size and required consideration of other factors, this study is still a timely one insofar as it captures the importance of the role of the media in times of a global pandemic. Second, the empirical findings of this study are only valid for South Korea and perhaps cannot be generalized. In South Korea, ONM can provide immediate news content from legacy media under the contract between ONM and legacy media. However, the situation might be different in other countries where intellectual property rights might prevent the free sharing of news content on other platforms. Thus, our findings may not be applicable to those countries where conflicts between ONM and legacy media have not been resolved. In this respect, a comparison of ONM in different countries needs to be carried out in future research. Third, this study does not delve into a comprehensive analysis of measures taken by the government to combat misinformation. Although the dangers of peddling misinformation during a pandemic are evident, government intervention to prevent the same might not be possible due to possible infringements on the freedom of expression. While this issue was deemed to be beyond the scope of this study, it is imperative to investigate the government’s role in regulating misinformation in future research.

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