

## PAPER

# Trust, Information Quality, and User Perceptions in Mobile Social Networks: Implications for Mobile Learning and Health Crisis Communication

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Tafila, Jordan[khalid.alemerien@ttu.edu.jo](mailto:khalid.alemerien@ttu.edu.jo)**ABSTRACT**

The coronavirus COVID-19 outbreak has become a global crisis, where most nations are suffering from severe health and economic consequences. As known, the probability of infection is high, so it is important to understand the public perception of trust in sources of information, especially mobile social networks (MSNs). As a result, this information will assist in better informing public health messaging. In this study, we surveyed the users of MSNs to understand their perceptions regarding the utilization of MSNs as communication platforms during the COVID-19 outbreak. An online survey was utilized to collect the responses of 854 MSN users in mid-November 2024 using a questionnaire that we developed. The sample of participants was fairly similar to the general MSNs population in terms of gender, age, usage time, and education level. We found that 60% of the respondents mentioned that there is a lot of misleading, inaccurate, and anonymous information. The majority of the respondents stated that utilizing MSNs can be a helpful tool to promote and explain strict infection prevention policies proposed by the government to control the outbreak. Based on our findings, health professionals should lead the COVID-19 response to enhance trust in information sources. Consequently, it is crucial to emphasize and enhance the understanding and views of the use of MSNs during and following the crisis period.

**KEYWORDS**

mobile social networks (MSNs), information quality, coronavirus COVID-19, crisis, information security, user satisfaction

## 1 INTRODUCTION

The coronavirus COVID-19 is a novel infectious disease. It is known to cause illness ranging from mild symptoms to severe acute respiratory syndrome (SARS) [1]. The first cases were reported in Wuhan, China [2]. At the end of January 2020, the World Health Organization (WHO) proclaimed that coronavirus COVID-19 is

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a public health emergency of international concern [3]. The coronavirus dramatically spread worldwide, garnering significant global attention. As of 15 April 2020, more than 1.9 million confirmed cases across 210 countries, including more than 117000 deaths, had been reported [4].

The coronavirus pandemic has affected global health and economics. Indiscriminately, all social, cultural, and healthy lifestyles of individuals have been affected [5]. There is an urgent global need to combat COVID-19 through enhanced prevention and control efforts [6].

Mobile social networks (MSNs) have become key platforms for information dissemination and public discourse on COVID-19 [7]. In the coronavirus epidemic crisis era, people increasingly exchange health information on MSNs. Also, MSNs have played an increasingly important role in managing public health crises, including increasing the people's awareness regarding the symptoms, transition ways, and prevention methods of coronavirus COVID-19. Furthermore, MSNs are widely utilized in healthcare promotion efforts [8].

To take advantage of this huge amount of information about the coronavirus COVID-19 crisis exchanged over the MSNs, we need to pay attention to the information quality (IQ) in order to avoid obtaining misleading, inaccurate, and useless information during the epidemic era. High IQ leads to improve the individuals' knowledge to prevent and control the epidemic's spreading. Despite the widespread use of MSNs during the pandemic, little research has examined the quality of information shared on these platforms. To our knowledge, this is the first study to explore this issue. Therefore, this study was conducted to obtain and analyze timely people's responses in order to assist the governments and societies in dealing with information flow effectively for preventing and controlling the epidemic [9].

Throughout the COVID-19 pandemic, MSNs transformed from basic communication tools into critical platforms for mobile health education and crisis communication. Their capacity to enable real-time knowledge dissemination allowed organizations like the WHO and government agencies to utilize WhatsApp and Telegram chatbots for verified health guidelines, while social media literacy campaigns employed infographics and short-form videos to address misinformation. Moreover, crowd-sourced learning and citizen engagement on platforms such as Twitter (X) and Facebook groups facilitated peer-to-peer discussions regarding health best practices, vaccination awareness, and community-driven fact-checking. In addition to pandemic response initiatives, MSNs have played a crucial role in advancing mobile learning (m-learning) through the provision of interactive webinars, live questions-and-answer sessions, and AI-driven fact-checking tools. Their interactivity, accessibility, and user-generated content render them essential for knowledge dissemination, digital literacy, and public health education. Platforms such as WhatsApp, Telegram, Twitter (X), Facebook groups, and WeChat are enhancing mobile learning through the integration of AI-driven chatbots, adaptive security features, and real-time updates, thereby reinforcing their credibility and effectiveness as mobile learning environments.

Furthermore, the study attempts to highlight and measure the undesirable problems associated with the information obtained from MSNs regarding the coronavirus COVID-19 crisis as a case study, such as inaccuracy, ambiguity, redundancy, and incompleteness [10].

The rest of the paper is organized as follows: Section 2 discusses the related work and conceptual model. Section 3 describes the research methodology. The findings are presented and elaborated in Section 4. In Section 5, the findings were discussed in detail, and theoretical and practical implications are highlighted. Finally, Section 6 concludes the results of the study.

## 2 RELATED WORK

The uses of MSNs in the crisis management field may differ according to the information's purpose and type. In the health context, we found that the unexpected public emergency crises require an immediate response [11]. We now review the two main research streams that contributed to our research study: first, online social networks and epidemic crises; second, online social networks and information quality.

### 2.1 Online social networks and epidemic crises

In response to the epidemic, such as the 2009 H1N1 influenza, the (2007–2015) Zika virus, and the (2014–2015) Ebola virus, research has explored the opportunities and challenges of social media use in such crises by governments and the public. To address such challenges of using MSNs in health emergencies, Adebimpe et al. [12] evaluated the role of the MSNs in disseminating awareness about Ebola disease prevention and control in Nigeria. They found that health information regarding Ebola disease spread through MSNs should be regulated. Also, MSNs can be used to refute rumors on health information.

Furthermore, Chandrasekaran et al. [13] assessed the use of the following MSNs (Facebook, Twitter, Instagram, and YouTube) in providing information regarding the Zika virus. In this study, researchers searched for Zika virus in these MSNs, including only the first 50 search results in their analysis. These results were classified into three categories: useful, not useful, and misleading. Their findings showed that about fifty percent of the search results were useful. Furthermore, Bode and Vraga [14] conducted an experiment exposing users to Zika virus misinformation via a Facebook news feed and tested two correction techniques: algorithmic correction and user correction. Both correction techniques are effective to refute misinformation.

To investigate federal, state, and local government utility of Twitter during the 2015–2016 Zika virus outbreak in the USA, Hagen et al. [15] collected a Twitter dataset regarding the Zika virus when many reported cases in Florida. The study found that MSN usage varied across government levels, with federal agencies frequently using Twitter during emergencies.

Freberg et al. [16] analyzed the information sources, tagged words, and document types as prevalent references regarding H1N1 on blogs, Twitter, and Delicious. The results of the study stated the importance of verifying both the source and content of messages that are shared on MSNs to determine which one affects the individuals' behavior more. Liu and Kim [17] investigated the role of social media during the H1N1 crisis. They conducted a quantitative study to analyze the responses of 13 organizations to the H1N1 crisis through traditional and social media. Their findings showed that organizations prefer to use traditional media over social media. In [18], a comparative study was conducted to investigate the impact of using social media in the U.S. and China during the H1N1 epidemic. The study focused on the use of social media for health risk communication and its implications. In addition, several analysis studies were performed in the MSNs context to examine managing uncertainty during the Ebola outbreak using a dataset of tweets [19], characterizing public sentiment using “#Zika” Instagram images [20], and extracting and analyzing tweets belonging to the swine flu pandemic [21].

A few research studies conducted in response to the role of using online social networks during the coronavirus COVID-19 outbreak, such as identifying and analyzing

misinformation in tweets [22], producing a Twitter dataset regarding coronavirus COVID-19 [23], and proposing a framework to integrate online social networks as effective tools for managing the preparedness response to the coronavirus COVID-19 epidemic [24]. This study aims to collect, analyze, and discuss MSN user responses on IQ dimensions and sources during the COVID-19 crisis.

## 2.2 Online social networks and information quality

High IQ is both a key success factor and a critical concern for societies. Therefore, the exponential growth of information, especially on MSNs, necessitates high-quality information awareness. In [25], IQ frameworks were reviewed from academic and practitioner perspectives. In this study, the IQ dimensions in each framework were evaluated against the proposed methodology. Moreover, 15 IQ dimensions were identified. They also found that these IQ dimensions apply to healthcare and manufacturing. Kaufhold et al. [26] explored the barriers of using social media during conflicts and crises. Empirical studies, surveys, and workshops examined how social media alerts mitigate information overload and aid information gathering and mining. Kenett and Shmueli [27] stated that there are many information sources, such as web searches, surveys, experiments, social networks, and more. This results in a massive amount of information that can become unmanageable and problematic. Pourghomi et al. [28] found that most young MSN users readily believe shared social media information without verification. Therefore, unreliable sources may spread numerous hoaxes and rumors via mobile social networks.

Information quality frameworks have been applied in contexts such as information security, risk assessment [29], [32], eHealth [30], disaster assessment [31], tourism and social media [33], [34], and online purchasing [35]. Chen and Chang [35] investigated the relationships among rating, rating volume, review, information quality, and media richness in relation to satisfaction and purchase intention. Bhagat and Parrish [36] studied user motivations and perceptions of news sharing on social media based on IQ dimensions. Glogowska et al. [37] examined how reputation and user feedback affect perceived IQ in social media.

Apuke et al. [38] identified key IQ challenges on social media, such as contextual relevance and information overload. According to Batini et al. [39], practitioners and academics have not agreed on a standardized set of IQ dimensions. Moreover, the interactive elements, such as AI-powered fact-checking, mobile alerts, and chatbot-driven health advice, can enhance user engagement and learning on MSNs. Furthermore, these elements can be used for fact-checking and misinformation detection to filter misleading health content. Automated content verification systems enhance mobile learning credibility. Other interactive elements include chatbot-based learning and personalized assistance. For example, WhatsApp and Telegram chatbots supported COVID-19 self-assessment, symptom tracking, and health FAQs. Chatbots powered by natural language processing (NLP) provide interactive mobile-based learning experiences.

## 2.3 Information quality

In this study, we utilize the IQ framework dimensions and categories for e-health records [30], which formed the foundation of our research. These dimensions were empirically assessed in [40]. As shown in Figure 1, the IQ framework consists of three

main categories: Accuracy (Acc) refers to the degree to which information is correct and without mistakes; completeness (Com) refers to the degree to which information is sufficient; consistency (Con) refers to the similarity among perceived information; relevance (Rel) refers to how well information addresses users' questions; Usability (Usa) refers to the degree to which information is effective, efficient, and satisfactory for specific users to achieve specified goals; timeliness (Tim) refers to the degree to which up-to-date information is available when needed; understandability (Und) refers to the degree to which information is easy to understand; believability (Bel) refers to the degree to which information is credible; informativeness (Info) refers to the richness of information available on MSNs; quantity (Qua) refers to the amount of information. (2) communication quality consists of two dimensions: Provenance (Pro) is the extent to which information can be tracked to the origin source. Interpretability (Int) refers to the degree to which information can be clearly understood. And (3) Information security consists of three dimensions: Privacy (Pri) is the extent to which private information can be protected from unauthorized users and control the selective reveal of this information; confidentiality (Conf) refers to keeping information secret; secure accessibility (Sec) refers to how securely information can be accessed.

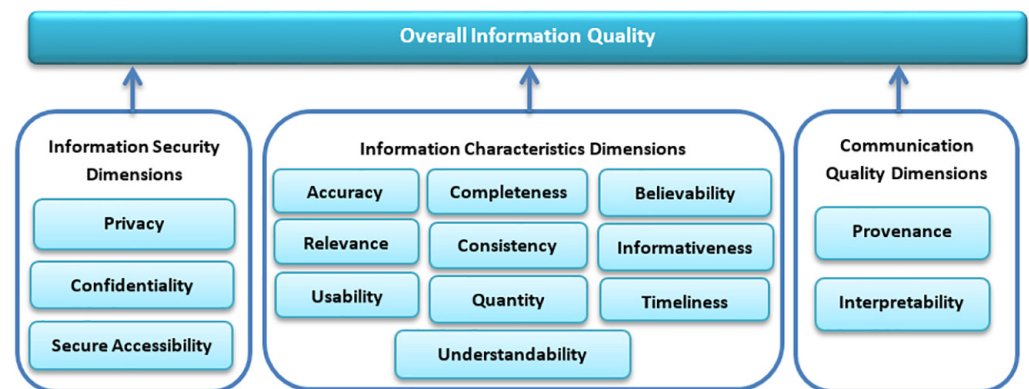


Fig. 1. A conceptual model of overall information quality

Adaptive mobile security measures play a crucial role in mitigating misinformation risks within MSNs, thereby enhancing trust and security in mobile learning environments. One significant approach is blockchain-based verification, which ensures source credibility and prevents the spread of false information. Platforms such as NewsGuard and Po.et leverage blockchain technology to validate the authenticity of digital learning materials, thereby fostering a more reliable educational ecosystem. User credibility scoring and AI-driven misinformation detection have emerged as effective tools in identifying and filtering misleading content. Advanced AI models like Google's BERT and Facebook's RoBERTa analyze MSN content for misinformation, while platforms use reputation scores and automated flagging to enhance content reliability. Furthermore, automated reporting and moderation help limit misinformation in MSNs. For example, WhatsApp has implemented message-forwarding limitations to restrict the rapid spread of potentially false information, while AI-powered moderation tools, such as IBM Watson for Education, assist in filtering harmful or misleading content within online learning communities. End-to-end encryption, two-factor authentication (2FA), and mobile privacy controls enhance security by ensuring private communication and preventing unauthorized access. By integrating these adaptive security mechanisms, MSNs can serve as safer

and more trustworthy platforms for mobile learning, ensuring that users engage with accurate and verified educational content.

## 2.4 Misinformation patterns in context of COVID-19

Misinformation concerning COVID-19 manifested distinctive patterns across social networking sites, greatly enhancing public confusion and distrust. Unsubstantiated claims about the virus—conspiracies linking COVID-19 to bioweapons or 5G networks—were given tremendous publicity. Such health advice led to misinformation about unproven treatments, while falsified data and cherry-picked statistics distorted scientific findings. The distribution of imitative impostor content featuring fake experts and mis-contextualization was also rampant in the spread of misinformation replications, such as unrelated images or video footage. Anti-vaccine rhetoric claiming that vaccines contained microchips or were part of a global control plan gained traction, often propelled further by sensationalized headlines and misrepresenting research. The persistent recurrence of these patterns of misinformation underscores the immense necessity for stringent source evaluation and reliance on credible health organizations to contain the spread of disinformation.

## 3 METHODOLOGY

In this section, we demonstrate the research questions and their associated hypotheses, the research model, the questionnaire as a research tool, and the characteristics of the study participants.

### 3.1 Research questions

Depending on the proposed model, we formulate three research questions with associated hypotheses as follows:

**RQ1:** How do the users of MSNs evaluate the quality of information about the COVID-19 crisis using the MSNs platforms?

**H1.1:** The MSNs are secure platforms to share information about the COVID-19 crisis.

**H1.2:** The MSNs are effective communication platforms regarding the COVID-19 crisis.

**H1.3:** The MSNs provide a high-quality information regarding the COVID-19 crisis.

**RQ2:** To which extent that the responses of users of MSNs support the credibility of MSNs as information sources regarding the COVID-19 crisis?

**H2.1:** The MSNs are credible information sources regarding the COVID-19 crisis.

**RQ3:** To which extent that the users of MSNs satisfy using the MSNs as sources of information regarding the COVID-19 crisis?

**H3.1:** The users of MSNs are satisfied to use MSNs as information sources regarding the COVID-19 crisis.

### 3.2 Research model

Figure 2 shows our research model, which explains the relationship between information quality, information security, and communication quality and user satisfaction in the context of using MSNs platforms as information sources during the pandemic crisis. The elements of the conceptual model are utilized to construct our research model, which is the basis for designing the research tool.

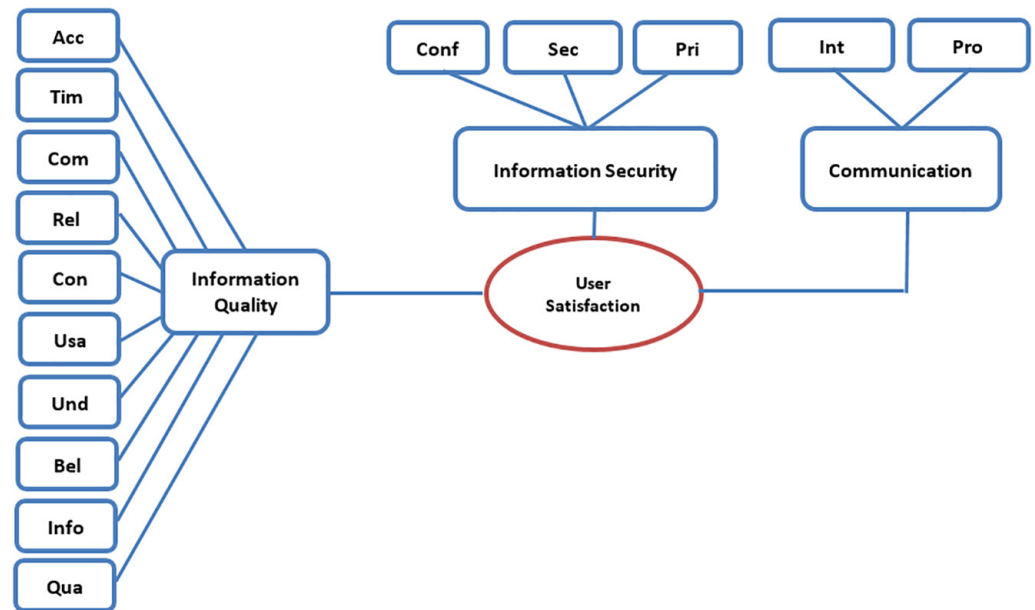


Fig. 2. Research model in the context of using MSNs during the pandemic crisis

### 3.3 Research design (questionnaire)

We developed an online survey to obtain the responses of MSNs users regarding their perceptions and attitudes of using MSNs as sources of information about coronavirus COVID-19 outbreak. The survey was developed including the following sections: Characteristics of participants, participants’ perceptions, and attitudes regarding the IQ categories and their dimensions. The validity, accuracy, and readability of the draft survey were judged by five faculty members, and refinements were made to improve the quality before distribution. The survey consists of 28 closed-ended questions, which are distributed into three main sections. First, the demographics section comprises five questions. Second, the information source section includes two questions. Third, the IQ section was divided into three main categories, including characteristics of IQ (14 questions), communication (two questions), and information security (five questions). The participants spent 10–15 minutes to complete and submit the survey. In addition, all questions in this section are measured using a 5-point Likert scale, with response options ranging from one (strongly disagree) to five (strongly agree), where two represents disagree, three represents neutral, and four represents agree.

The study was approved by the scientific research committee in the ITC College to ensure the applicability of ethical guidelines. We confirm that all research procedures were conducted in compliance with the Jordan personal data protection law to safeguard participant rights and data confidentiality.

Our respondents represent a general mobile user population rather than a specific digitally literate demographic. Furthermore, informed consent was obtained online from all participants prior to their involvement in the study. The study ensured participant anonymity through restricted access. We have clarified that participants were fully informed of their right to withdraw from the study at any stage without consequences, which was communicated during the informed consent process. All identifiable information was either removed or securely encrypted. If applicable, we have also provided a justification for exemption from ethical approval, confirming that the study complied with institutional ethical standards.

### 3.4 Study participants (population characteristics)

A total of 854 MSNs participants were involved in this study. We used a questionnaire that is used to ask the participants to answer the questions regarding their perceptions and attitudes of using online social networks as a primary information source concerning COVID-19.

To maintain fairness and eliminate potential bias, no incentives were offered to participants for their involvement in the study. A total of 896 responses were collected; however, 42 incomplete or deficient responses were excluded from the analysis. Consequently, the final sample comprised 854 valid responses, which yield a response rate of 95.3%. The demographic characteristics of the participants are illustrated in Table 1.

Figure 3 shows the number of participants per information source about COVID-19. The participants may use one or more information sources regarding the COVID-19. The higher main information sources of COVID-19 are MSNs (854), TV (619), and Internet websites (389). The health officials, healthcare professionals, friends and family members, and newspapers and magazines showed lesser information sources regarding the COVID-19, with a number of participants of 296, 262, 197, and 86, respectively. Furthermore, Figure 4 demonstrates the difference in terms of the number of hours of using MSNs before and during the pandemic.

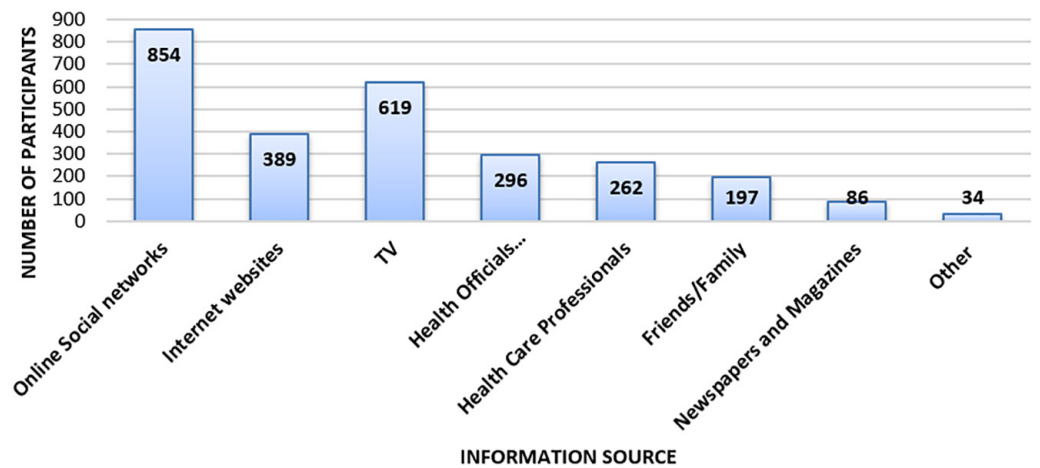
**Table 1.** Demographic characteristics of participants

Characteristics	Values	Number	Percentage
Age	18–24	417	48.83%
	25–30	188	22.01%
	31–40	138	16.16%
	41 and above	111	13%
Gender	Male	412	48.24%
	Female	442	51.76%
Profession	Applied Sciences (e.g. Sciences, Engineering, ...)	481	56.3%
	Humanity Sciences (e.g. Arts, Business, Education, ...)	145	17%
	Medical Sciences (e.g. Medicine, nursing, Medical labs, Ancillary medical professions, ...)	102	11.95%
	Other	126	14.75%

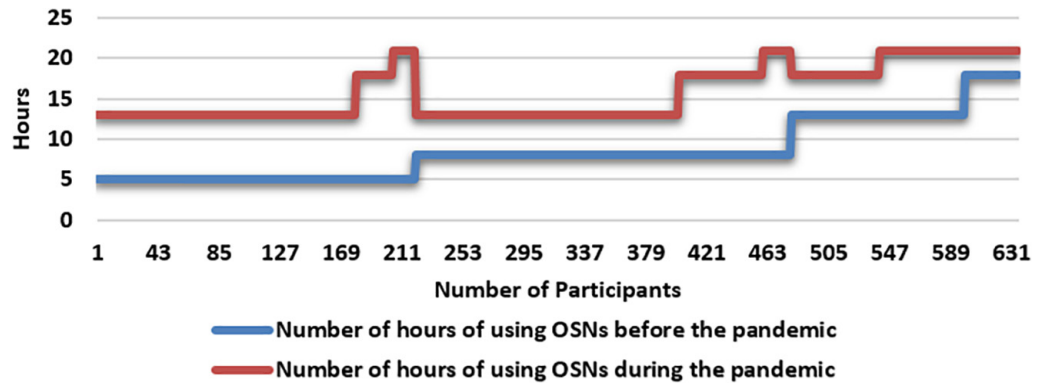
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**Table 1.** Demographic characteristics of participants (Continued)

Characteristics	Values	Number	Percentage
Marital status	Single	531	62.18%
	Married	301	35.25%
	Other	22	2.57%
Educational Level	Intermediate Diploma and less	94	11%
	Bachelor	607	71.08%
	Higher Diploma and above	153	17.92%



**Fig. 3.** The participants' distribution per information source



**Fig. 4.** Number of hours of using MSNs before and during the pandemic

Figure 5 shows the participants' distribution per MSNs as information sources during the pandemic era. Most participants reported that they used more than one MSN to gain information about COVID-19. These MSNs are Facebook (658), WhatsApp (190), YouTube (126), X (Twitter) (82), Snapchat (28), Instagram (95), and others (171). Figure 6 presents the responses of participants about re-sharing posts, videos, and photos regarding the COVID-19 pandemic without ensuring their correctness. The findings show that 85% of participants re-share the information regarding the COVID-19 pandemic without ensuring its correctness. This may lead to re-share misleading information about the crisis. Furthermore, about 13% of participants are interested in verifying the information before they repost about the COVID-19 pandemic. Furthermore, Figure 7 illustrates that the majority of participants verified the posts, videos, and photos that are received from MSNs regarding the COVID-19 pandemic.

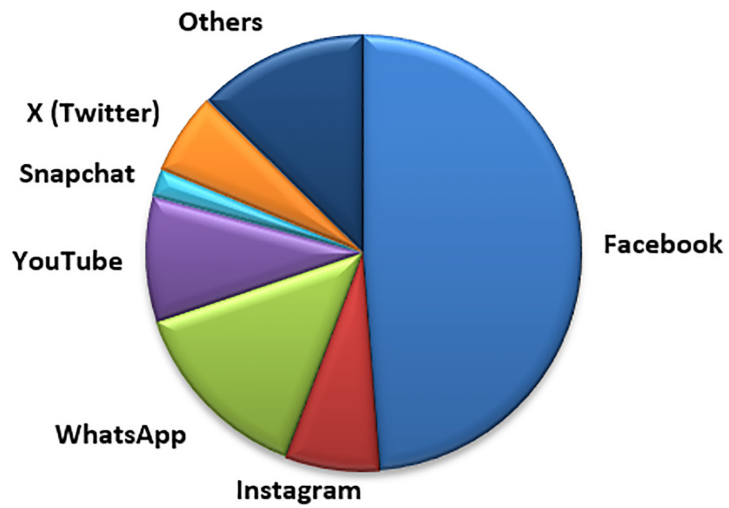


Fig. 5. The participants' distribution per MSNs as information source of COVID-19

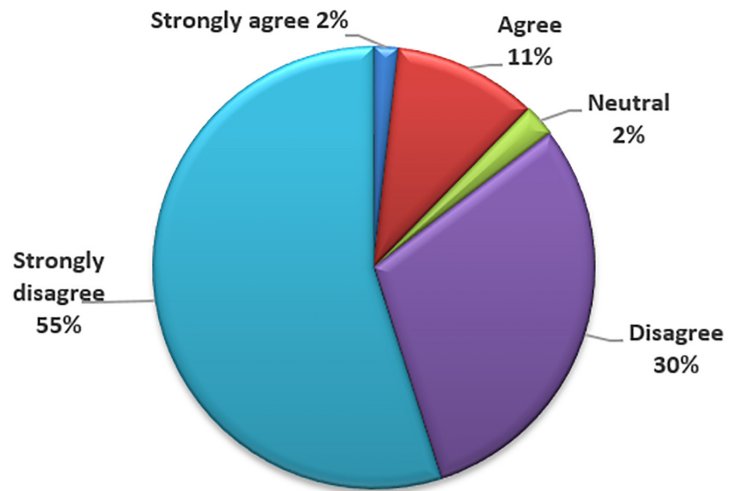


Fig. 6. Responses of participants about re-sharing posts, videos, and photos regarding the COVID-19 pandemic without ensuring their correctness

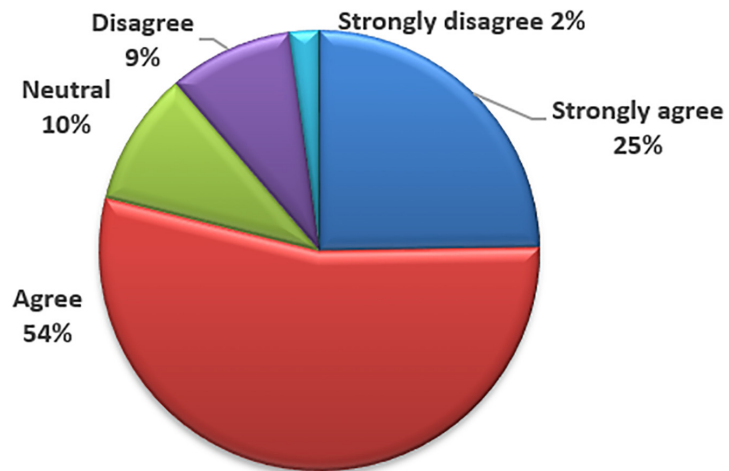


Fig. 7. Responses of participants about verifying the posts, videos, and photos that are received from MSNs regarding the COVID-19 pandemic

### 3.5 Statistical analysis

We analyzed and validated the obtained data using SPSS 26 software. Descriptive analysis was applied based on the obtained data frequencies and proportions. Moreover, the study employs advanced statistical methods, such as confirmatory factor analysis (CFA) and structural equation modeling (SEM), to establish the reliability and validity of the model. CFA was utilized to assess convergent and discriminant validity, thereby confirming the construct validity of the measurement model beyond Cronbach's alpha and average variance extracted (AVE). Furthermore, SEM was employed for structural model analysis aimed at hypothesis testing and the investigation of relationships among the study factors. In order to investigate the level of association among variables, we used discriminant validity of the measurement model and structural model analysis. Moreover, the p-value ( $< 0.05$ ) is considered statistically significant.

## 4 RESULTS

Table 2 shows the reliability of the questionnaire using the Cronbach test. We used 14 questions for information quality, which achieved excellent Cronbach alpha reliability (0.93). This value shows high internal consistency, which means that the questions are strongly related and measure the IQ construct effectively. Furthermore, the information security questions gained acceptable reliability with Cronbach's alpha (0.724), which indicates a reasonable consistency to measure the information security construct. The Communication Quality dimension has acceptable reliability with a Cronbach alpha of 0.724, though reliability tends to be lower with fewer items. In addition, the overall internal consistency across all 23 items is very high (alpha = 0.923), which indicates that the questionnaire provides highly reliable and consistent measurements across all the model dimensions.

Figure 8 illustrates the participants' responses related to the information quality, communication quality, information security, and user satisfaction factors. The majority of participants' responses provide high positive ratings of information provided by MSNs about the Corona crisis during the pandemic in all dimensions except the information provenance.

**Table 2.** Results of Cronbach test

	N of Items	Cronbach's Alpha
Information Quality–User satisfaction	14	0.930
Information Security–User Satisfaction	5	0.724
Communication Quality–User Satisfaction	2	0.752
Overall Cronbach	23	0.923

Table 3 demonstrates the results of convergent validity of the measurement model. The IQ construct shows strong convergent validity, with an AVE of 0.70, which means 70% of the variance in this construct is explained by its dimensions. The composite reliability (CR) of 0.959 suggests high internal consistency of the IQ dimensions. Moreover, the communication quality construct meets the convergent validity criteria, including AVE (0.732) and CR (0.842), which are within acceptable ranges. However, since this construct has only two dimensions, reliability may be improved

by adding more questions. The information security construct has high reliability and good convergent validity that are supported by its AVE of 0.744 and CR of 0.892. However, the privacy dimension (Pri = 0.567) is relatively weak. Therefore, this dimension needs to be investigated. In addition, the user satisfaction construct has an AVE of 0.522, which suggests the dimensions moderately explain the variance in user satisfaction. However, CR is only 0.572, which is below the acceptable 0.7 threshold. This means that the items measuring user satisfaction are not highly consistent.

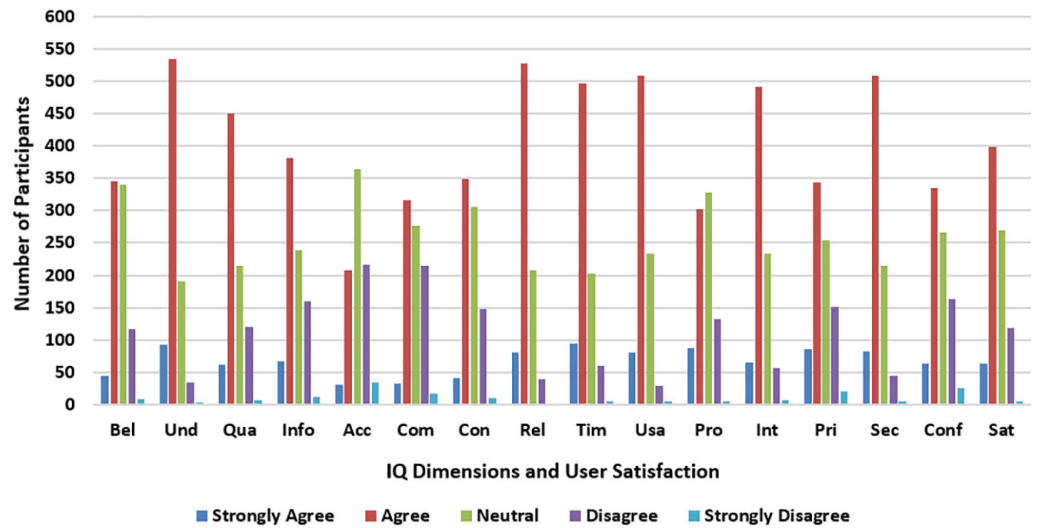


Fig. 8. The results of participants' responses of information quality, communication quality, information security, and user satisfaction

Table 3. Convergent validity of measurement model

Construct		Average Factor Loadings	AVE	CR
Information Quality	Bel	0.807	0.70	0.959
	Und	0.577		
	Qua	0.785		
	Info	0.851		
	Acc	0.842		
	Com	0.901		
	Con	0.682		
	Rel	0.704		
	Tim	0.736		
	Usa	0.663		
	Con	0.769		
Communication Quality	Pro	0.857	0.732	0.842
	Int	0.782		
Security	Pri	0.567	0.744	0.892
	Sec	0.905		
User Satisfaction	Sat	0.632	0.522	0.572

Table 4 provides the results of discriminant validity. On one hand, we observed that IQ in terms of Bel, Und, Qua, Info, Acc, Com, Con, Rel, Tim, and Usa has a strong correlation (0.4–0.6) within dimensions that indicate a cohesive construct. On the other hand, dimensions, including Bel, Qua, and Info, show the highest internal correlations (above 0.5). The communication quality (Pro, Int) achieved moderate correlations with other constructs (mostly 0.3–0.5). Moreover, the Pri dimension has very low correlations (below 0.2) with other constructs, which indicates a weak connection. In addition, Security (Sec) is more aligned with other dimensions (~0.3), which indicates stronger validity than Pri. The Pri dimension is weak to effectively measure the security construct. The Sat dimension has strong correlations with other constructs (0.4–0.5), which means the user satisfaction dimension is linked to multiple dimensions such as IQ and communication quality. Table 5 presents the structural model analysis, which evaluates the strength and significance of relationships between different dimensions and user satisfaction (Sat). The R<sup>2</sup> value = 0.64052 indicates that the 15 factors explain 64.05% of the variance in Sat. This leads to a strong proposed model. The results describe the following key observations from supported relationships: Usa has the strongest positive effect on Sat ( $\beta = 0.200$ ,  $t = 4.601$ ,  $p < 0.0001$ ), which indicates that Usa is the most influential factor. Furthermore, the Bel, Int, Qua, and Conf dimensions.

**Table 4.** Discriminant validity of measurement model

	Bel	Und	Qua	Info	Acc	Com	Con	Rel	Tim	Usa	Pro	Int	Pri	Sec	Conf	Sat
Bel	1.00															
Und	0.421	1.00														
Qua	0.477	0.411	1.00													
Info	0.481	0.392	0.573	1.00												
Acc	0.542	0.335	0.448	0.52	1.00											
Com	0.517	0.305	0.566	0.639	0.633	1.00										
Con	0.498	0.385	0.471	0.533	0.556	0.629	1.00									
Rel	0.338	0.296	0.348	0.403	0.32	0.367	0.459	1.00								
Tim	0.353	0.341	0.396	0.448	0.345	0.431	0.466	0.488	1.00							
Usa	0.443	0.37	0.423	0.424	0.429	0.413	0.511	0.486	0.54	1.00						
Pro	0.369	0.281	0.311	0.429	0.474	0.421	0.453	0.399	0.362	0.41	1.00					
Int	0.276	0.385	0.378	0.393	0.329	0.319	0.426	0.47	0.394	0.493	0.442	1.00				
Pri	0.083	0.165	0.075	0.056	0.053	0.066	0.063	0.097	0.101	0.061	0.055	0.144	1.00			
Sec	0.207	0.305	0.271	0.281	0.196	0.27	0.284	0.368	0.386	0.327	0.247	0.374	0.177	1.00		
Conf	0.219	0.19	0.241	0.272	0.266	0.249	0.291	0.24	0.194	0.263	0.294	0.274	-0.05	0.275	1.00	
Sat	0.48	0.388	0.473	0.471	0.464	0.475	0.516	0.414	0.433	0.525	0.425	0.442	0.019	0.322	0.304	1.00

**Table 5.** Results of the structural model analysis at  $R^2 = 0.64052$ 

Relationship	Std. Error	Unstandardized Coefficient (B)	Path Coefficient (Beta)	t Value	Sig.	
Bel→Sat	0.036	0.136	0.129	3.827**	0.0001	Support
Und→Sat	0.039	0.071	0.056	1.829	0.068	Not Support
Qua→Sat	0.035	0.106	0.104	3.042*	0.002	Support
Info→Sat	0.035	0.027	0.029	0.780	0.435	Not Support
Acc→Sat	0.035	0.058	0.059	1.621	0.105	Not Support
Com→Sat	0.039	0.036	0.037	0.912	0.362	Not Support
Con→Sat	0.038	0.097	0.094	2.546*	0.011	Support
Rel→Sat	0.041	0.039	0.031	0.951	0.342	Not Support
Tim→Sat	0.038	0.051	0.044	1.334	0.183	Not Support
Usa→Sat	0.043	0.200	0.160	4.601**	0.000005	Support
Pro→Sat	0.031	0.066	0.068	2.131*	0.033	Support
Int→Sat	0.038	0.111	0.095	2.880*	0.004	Support
Pri→Sat	0.024	-0.058	-0.063	-2.434*	0.015	Support
Sec→Sat	0.035	0.067	0.057	1.928	0.054	Not Support
Conf→Sat	0.025	0.053	0.057	2.073*	0.038	Support

Significantly impact Sat, which reinforces that users value reliable information. Moreover, the Pri dimension has a negative relationship with Sat ( $\beta = -0.058$ ,  $p = 0.015$ ), which means that concerns about privacy reduce user satisfaction.

The key observations from non-supported relationships, including hypotheses (Sec → Sat) and (Und → Sat), are close to significance ( $p = 0.054$  and  $p = 0.068$ ), respectively, but they do not meet the 0.05 threshold. This suggests security might have some influence on user satisfaction. Furthermore, the Tim, Rel, and Com dimensions do not significantly affect user satisfaction, which implies that these dimensions may not be the primary concerns for participants. Moreover, providing more information shows no impact and does not necessarily increase user satisfaction.

## 5 DISCUSSION

The study explored the quality of information provided by MSNs during the COVID-19 crisis to examine dimensions such as information quality, security, and communication quality, which collectively ensure user satisfaction. The results revealed that the proposed model is based on a combination of IQ (believability, quantity, consistency, usability, and understandability), information security (privacy, security, and confidentiality), and communication quality (interpretability and provenance) and can influence user satisfaction. Therefore, the proposed model can be considered a strong foundation to provide high-quality information through MSNs. Also, these dimensions can guide the usability and security practitioners to make effective decisions regarding the information provided by MSNs. This study provides statistical evidence that meets the findings of other studies such as [6], [29], [41], [42], and [45].

Regarding the research questions RQ1, RQ2, and RQ3, the findings of our study positively support the hypotheses (H1.1, H1.2, and H1.3). In addition, MSNs can be an effective source to provide high-quality information regarding the COVID-19 crisis. This evidence supports the hypothesis (H2.1). The findings support participant satisfaction with the information shared on MSNs platforms during the COVID-19 crisis. This evidence supports the hypothesis (H3.1).

Misinformation in MSNs poses a significant threat to mobile-based health literacy. Misinformation can distort public understanding of essential health information, hinder informed decision-making, and contribute to widespread confusion during health crises. Therefore, many individuals rely on MSNs such as WhatsApp, Twitter (X), and Facebook for real-time health updates. Moreover, the rapid spread of false or misleading information can lead to public panic, reduced trust in medical institutions, and harmful behavioral responses. For instance, during the COVID-19 pandemic, misinformation about vaccine safety and alternative treatments proliferated through MSNs, undermining public confidence in scientific recommendations. Such instances highlight the need for fact-checking mechanisms, AI-driven misinformation detection, and expert-verified content dissemination to safeguard mobile health literacy. To enhance digital health education, it is essential to integrate interactive tools within MSNs, such as chatbot-based health advisories, real-time alerts, and AI-powered verification systems, which ensure users receive accurate and reliable content.

Another interesting finding is that the potential of interactive learning models within MSNs presents an opportunity to enhance mobile-based health literacy and crisis communication by leveraging dynamic and user-centered engagement strategies. Interactive models, such as gamification, AI-powered chatbots, and user-generated discussions, facilitate deeper engagement, making complex health information more digestible and accessible. For example, mobile-friendly infographics, short-form educational videos, and quiz-based learning modules have been widely used in MSNs to promote fact-based health literacy. Furthermore, numerous design practices in mobile-responsive crisis communication content should be prioritized to optimize the effectiveness of such interventions. For example, the MSNs designers ensure concise messaging, mobile-friendly formatting, multilingual accessibility, and real-time updates to effectively reach diverse audiences.

Finally, personalized notifications, adaptive content delivery, and collaborative learning spaces within MSNs can further reinforce engagement and trust in mobile health literacy initiatives. By adopting evidence-based design principles and integrating user feedback loops, MSNs can serve as powerful tools for digital health education. These practices ensure that mobile-based learning remains accurate and responsive to crisis communication needs.

## 5.1 Theoretical implications

The study imposes several theoretical implications as follows: (1) Advancement of IQ theory in MSNs. A structured framework is introduced to evaluate the quality of information on MSNs that incorporates dimensions such as believability, quantity, consistency, usability, and understandability. Furthermore, the findings of our study contribute to existing IQ models and emphasize how social media platforms impact information reliability and trustworthiness in crisis situations. (2) Integration of information security in user satisfaction models. This study incorporates information security (privacy, security, and confidentiality) as a factor influencing user satisfaction. In addition, the proposed model reinforces the importance of data

protection and user trust when disseminating critical information via MSNs [43]. (3) Enhancement of communication quality frameworks.

In our study, we introduce interpretability and provenance as key communication quality factors that contribute to user trust and satisfaction in MSN platforms. This aligns with existing media credibility theories and spotlights transparency and source reliability in digital communication [46]. Moreover, these advancements in digital communication may pose serious concerns for interpersonal relationships and mental and physical health, such as addiction to mobile devices and social media [47], [48]. Finally, (4) empirical validation of MSNs as reliable information sources. Our study provides statistical evidence that supports the role of MSNs in delivering high-quality information during crises. Furthermore, this study challenges traditional perceptions that MSN platforms lack reliability and highlights their potential as authoritative sources for public health and crisis management.

## 5.2 Practical implications

We believe that our study has practical implications in providing high-quality information through the MSNs platforms as follows: (1) Guidelines and recommendations for MSNs platforms and policymakers to enhance IQ and implement automated verification mechanisms to ensure believability [49], usability, and consistency in shared content [44]. (2) Improving machine learning and AI-driven content ranking for crisis information using the proposed above dimensions to prioritize high-quality and verified information. (3) Application in public health communication strategies. Health organizations and governments can leverage MSNs to effectively distribute verified COVID-19 information. (4) Furthermore, this study supports the integration of trusted MSNs communication channels in emergency response plans.

## 5.3 Study limitations

Our study may have limitations that may affect its findings generalization, such as limited generalizability beyond the COVID-19 context, as user perceptions may differ in non-crisis scenarios. Furthermore, reliance on self-reported data, which may introduce response bias. Moreover, the lack of longitudinal analysis to assess long-term changes in user trust and security awareness.

Misinformation is dynamic. It persistently adjusts in reaction to technological innovations, platform regulations, and societal awareness. In MSNs, social media algorithms, fact-checking systems, and user behaviors advance, while misinformation tactics adapt to evade detection. This encompasses (1) novel strategies; purveyors of misinformation often modify their methods, employing deepfake videos, AI-generated content [50], and encrypted messaging platforms to circumvent detection. Algorithmic influence: MSNs platforms perpetually revise their algorithms to mitigate misinformation; however, these modifications may unintentionally generate new vulnerabilities [51]. (3) Cross-platform dissemination: Misinformation has become increasingly interconnected across various platforms [52], complicating efforts to monitor and regulate it.

The study primarily focuses on misinformation regarding COVID-19; however, analogous patterns of false information are present in other domains such as politics, climate change, and public health crises. Contextual factors may affect audience responses and the spread of misinformation. Misinformation regarding COVID-19

often exploited fear, uncertainty, and scientific complexity, which may not align with strategies pertinent to political or economic contexts. In this context, we emphasize the subsequent concerns: Individuals engage in crisis-driven information seeking during global crises, making them more susceptible to misinformation. This behavior may not be entirely relevant in non-crisis contexts. Cultural and regional disparities: the study's findings may be more applicable in regions with similar media landscapes, levels of digital literacy, and institutional trust. Although other forms of misinformation may yield prolonged ideological or financial repercussions, COVID-19 misinformation produced immediate health ramifications.

We recognize several key concerns associated with self-reported data. Recall bias may arise when participants struggle to accurately recall past behaviors or experiences. In addition, social desirability bias can influence responses. For example, individuals may provide answers they believe are more acceptable rather than entirely truthful. Furthermore, self-selection bias is a potential limitation. This issue can arise when those who choose to participate in the study may have characteristics that differ from those who opt not to respond, which potentially affects the generalizability of the findings. To mitigate these biases, we implemented several strategies, such as: We ensured participant anonymity to encourage honest responses. Furthermore, we used neutral and non-leading question phrasing to minimize response distortion. Moreover, we performed cross-validating responses where possible through consistency checks and comparison with existing data sources.

## 6 CONCLUSIONS

The proposed model is structured based on incorporating three main dimensions (information quality, information security, and communication quality). The findings provided statistical evidence that supports the application of the proposed model to ensure the provision of high-quality information regarding the COVID-19 crisis using MSNs. In addition, our study found that MSN platforms can be utilized effectively to measure audience attention given to global health emergencies. The study found that the lack of timely sharing of information about coronavirus COVID-19 via MSNs leads to insufficient and ineffective coronavirus crisis assessment. Neglecting the urgency of the situation and limited reporting on the virus from early infected countries partially contributed to the rapid spread of COVID-19 throughout the world in a short period. Success in effectively utilizing MSNs during times of crisis relies heavily on the timely sharing of information, finding the most appropriate MSNs, using the right language, and answering queries raised about the COVID-19 outbreak. Our findings highlight how MSNs simplify the process of communicating coronavirus risks to a large audience while complicating the development of clear and impactful messages during the COVID-19 outbreak and periods of uncertainty.

Future research directions include analyzing the impact of misinformation regulation policies on MSNs. Also, examining the effectiveness of AI-driven approaches for real-time fact-checking in MSNs. Furthermore, conducting cross-national studies to assess cultural differences in mobile social media trust.

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