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Digital media, risk perception, and earthquake preparedness among Indonesian urban youth

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Earthquakes pose an ongoing threat in Indonesia, particularly in densely populated urban areas near fault lines. Despite increased access to digital platforms for disaster information, many young individuals remain underprepared for seismic events. This study investigates how digital media influences earthquake preparedness through the mediating role of risk perception, focusing on Generations Y and Z in urban Java – demographics known for high digital engagement yet low practical readiness. A cross-sectional survey of 238 respondents aged 18–42 employed a structured questionnaire measuring digital risk amplification, risk perception, and preparedness behaviour. Statistical analysis included descriptive statistics, regression modelling and mediation testing using the Baron and Kenny framework, with Sobel test validation. The results indicate that digital media exposure significantly predicts risk perception, which in turn has a strong positive effect on preparedness. However, digital media alone does not directly influence preparedness behaviour. Risk perception fully mediates the relationship between digital exposure and readiness, suggesting that awareness raised by digital content must be internalised as personally relevant to translate into action. These findings provide empirical support for the Social Amplification of Risk Framework and the Diffusion of Innovations Theory, highlighting the importance of cognitive and emotional engagement in digital risk communication. The study contributes to disaster communication literature by identifying key psychological mechanisms linking digital information consumption with protective behaviour. It also offers practical insights for designing persuasive, emotionally resonant and action-oriented disaster messaging for younger urban populations in high-risk regions such as Indonesia.

Contribution: This study contributes empirical evidence on how digital risk communication affects disaster preparedness through cognitive pathways, offering insights for designing more effective public risk messages in the Indonesian context.

Keywords: earthquake preparedness; risk perception; digital risk amplification; social amplification of risk framework; generation Y; generation Z; disaster risk communication; digital media engagement.

Introduction

Indonesia's location along the Pacific Ring of Fire renders it one of the most disaster-prone nations globally, with earthquakes being a frequent and devastating hazard (Badan Nasional Penanggulangan Bencana [BNPB] 2023). Java Island, the country's most densely populated and economically strategic region, faces particularly high seismic risk because of urban density, infrastructure concentration and proximity to active fault lines. In this context, earthquake preparedness has emerged as a critical aspect of disaster risk reduction (DRR), particularly for urban communities. Preparedness encompasses a range of proactive behaviours, including emergency planning, hazard awareness and resource mobilisation, all of which serve to reduce vulnerability and enhance resilience (Lindell & Perry 2012).

One of the strongest psychological predictors of disaster preparedness is risk perception – how individuals interpret the probability, severity and personal relevance of a threat (Paton 2003; Wachinger et al. 2013). Slovic (1987) emphasised that individuals with higher perceived risk are more likely to adopt protective behaviours, especially in contexts of uncertainty. However, in Indonesia, despite intensified efforts by government and civil society actors, actual preparedness levels remain low, particularly among younger generations who are widely assumed to be well informed (Amri 2017). This paradox raises important questions about the effectiveness of current risk communication strategies.

With the advent of mobile technology and widespread internet penetration, digital media has become a primary channel for disseminating disaster-related information. As of 2023, over 77% of

Indonesians were active internet users, with Generations Y (1981–1996) and Z (1997–2012) being the most digitally engaged segments (We Are Social & Meltwater 2023). These cohorts extensively use platforms such as Instagram, TikTok and official early warning apps like *Badan Meteorologi, Klimatologi, dan Geofisika* [Indonesian Agency for Meteorology, Climatology, and Geophysics] (BMKG) and InaRISK for accessing real-time alerts and educational content (Houston et al. 2015). However, the actual impact of such media exposure on behaviour is not always linear. Emerging research suggests that overexposure to alarming or sensationalised content may lead to psychological desensitisation – a phenomenon referred to as *fear fatigue* (Cho & Salmon 2007), where individuals tune out risk signals despite repeated warnings.

The social amplification of risk framework (SARF) offers a valuable lens for understanding how risk signals are processed and interpreted through media environments. According to SARF, risk messages can be amplified or attenuated depending on how they are framed, repeated and received by audiences (Kasperson et al. 1988; Renn 2011). Digital media, with its emphasis on visual storytelling and algorithm-driven content, has the potential to intensify perceived risk – but may also lead to disengagement if not designed thoughtfully (Sun, Ren & Ge 2025). Complementing this is the diffusion of innovations (DOI) theory (Rogers 2003), which explains how individuals adopt new ideas or behaviours through stages such as awareness, interest, evaluation and implementation. In the context of disaster preparedness, this theory helps explain how digital information must be perceived as useful, credible and relevant to be acted upon.

Despite the growing importance of digital platforms in disaster communication, few empirical studies have examined how risk perception mediates the relationship between digital media exposure and preparedness – particularly in the Southeast Asian context (Laosunthara et al. 2024). The psychological mechanisms that link information consumption to behaviour remain underexplored, especially among digitally active but behaviourally passive urban populations (Austin, Liu & Jin 2012; Houston et al. 2015).

This study seeks to address that gap by examining the mediating role of risk perception in the relationship between digital risk amplification and earthquake preparedness among Generations Y and Z in urban Indonesia. Specifically, it investigates three questions: (1) Does digital risk amplification influence risk perception among Indonesian youth? (2) To what extent does risk perception affect their earthquake preparedness? and (3) Does risk perception mediate the relationship between digital risk amplification and preparedness?

By integrating SARF and DOI within a mediation model, this study contributes to both theory and practice. It provides empirical insights for designing more effective digital communication strategies tailored to younger urban populations in disaster-prone settings, ultimately aiming to translate awareness into action.

While a systematic literature review offers valuable insights into the breadth and scope of existing research, this study was designed to empirically test a theory-driven mediation model that integrates the SARF and the DOI theory. The objective was not to map existing findings but to examine specific hypothesised relationships among digital risk exposure, risk perception and earthquake preparedness using a quantitative survey method. This approach allowed for the operationalisation and statistical testing of mediating mechanisms in a high-risk, underexplored population segment.

Theoretical framework

This study draws upon two key theoretical perspectives: the SARF and the DOI theory. Together, these frameworks offer a comprehensive lens for understanding how digital media influences risk perception and, consequently, disaster preparedness behaviour.

Social amplification of risk framework

The SARF, introduced by Kasperson et al. (1988), conceptualises risk not merely as an objective hazard but as a socially mediated construct. It argues that risk signals are amplified or attenuated as they pass through communication processes involving media, institutions and interpersonal networks (Renn 2011). This transformation is influenced by framing, frequency, emotional tone and credibility of the message source.

In disaster communication, digital media platforms – including social media, early warning apps and official websites – serve as central amplification stations. These platforms enhance perceived risk through mechanisms such as visual storytelling, algorithmic repetition and rapid dissemination (Sun et al. 2025).

However, repeated or sensational exposure may backfire, leading to fear fatigue – a psychological state in which individuals become emotionally desensitised, overwhelmed or cynical because of persistent exposure to fear-inducing content (Cho & Salmon 2007). This phenomenon can undermine the perceived credibility of risk messages and reduce the motivation to adopt protective behaviours (Nabi 2003; Witte & Allen 2000). In disaster communication, fear fatigue may manifest when alarmist digital content saturates users' feeds, causing avoidance or disengagement rather than preparedness.

Relevant to this study are SARF's concepts of amplification sources (e.g. official agencies, influencers), channels (e.g. TikTok, Instagram, BMKG apps) and behavioural outputs such as preparedness planning or message sharing. Additionally, the framework acknowledges the role of interpretive communities – such as families or online peer groups – in reshaping the meaning and salience of risk information (eds. Pidgeon, Kasperson & Slovic 2003).

Diffusion of innovations theory

To complement SARF, this study adopts the DOI theory (Rogers 2003), which explains how new ideas or technologies are disseminated and adopted over time within social systems. The theory outlines a five-stage adoption process: knowledge, persuasion, decision, implementation and confirmation.

In disaster preparedness, these stages manifest in how individuals encounter and assess risk messages via digital media, and whether they convert that awareness into action (Morelli et al. 2022). Five perceived attributes determine the adoption rate of innovations: relative advantage (perceived superiority over traditional media), compatibility (fit with users' values and habits), complexity (ease of use), trialability (opportunity to experiment) and observability (visibility of the outcomes). Research has shown that Generations Y and Z, because of their high digital fluency, are particularly responsive to these factors, making them key targets for digital risk communication (Houston et al. 2015).

By integrating SARF and DOI, this study constructs a dual-layered conceptual framework: SARF explains the cognitive shaping of risk perception through media amplification, while DOI accounts for the behavioural adoption of preparedness actions based on that perception. The interplay of these theories provides the foundation for examining the mediating role of risk perception in the digital disaster communication process.

Research methods and design

Study design

This study employed a quantitative, cross-sectional survey design to examine the relationships among digital risk amplification, risk perception and earthquake preparedness, with a specific focus on the mediating role of risk perception. The design was explanatory in nature, aiming to test hypotheses derived from the SARF and the DOI theory. These theories were integrated into a conceptual mediation model, which guided both data collection and analysis (see Figure 1).

The linear mediation model presented in Figure 1 is grounded in both the SARF and the DOI theory. Social amplification of risk framework posits that risk signals transmitted through digital media can amplify or attenuate individual perceptions of risk, subsequently shaping emotional and behavioural responses (Kasperson et al. 1988; Renn 2011). This aligns with empirical studies demonstrating that digital exposure to risk-related content – especially via social media – affects the salience and urgency of perceived threats (Austin et al. 2012; Pourebrahim et al. 2019). In parallel, DOI suggests that such risk perception acts as a precursor to adoption behaviour, including preparedness actions in the context of disaster risk (Paton 2003; Rogers 2003). Thus, the proposed linear pathway reflects an established theoretical and empirical basis for the mediating role of risk perception between digital exposure and protective behaviour.

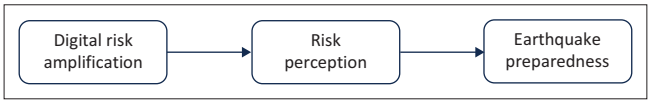


FIGURE 1: Conceptual mediation model integrating the social amplification of risk framework and the diffusion of innovations theory.

While the cross-sectional design inherently limits causal inference, several methodological strategies were employed to strengthen the study's internal validity and analytical rigour. Validated measurement instruments were adopted for all key constructs to ensure construct validity and internal consistency. The survey instrument was pilot tested with a subsample (n = 30) to refine item clarity and minimise potential bias. To address concerns of common method variance, statistical controls were applied, including Harman's single-factor test. Mediation effects were examined using bias-corrected bootstrapping procedures with 5000 resamples to enhance the robustness of indirect effect estimates. Furthermore, theoretical triangulation – through the integration of the SARF and the DOI theory – provided a multidimensional interpretive framework, thereby reinforcing the explanatory strength of the model.

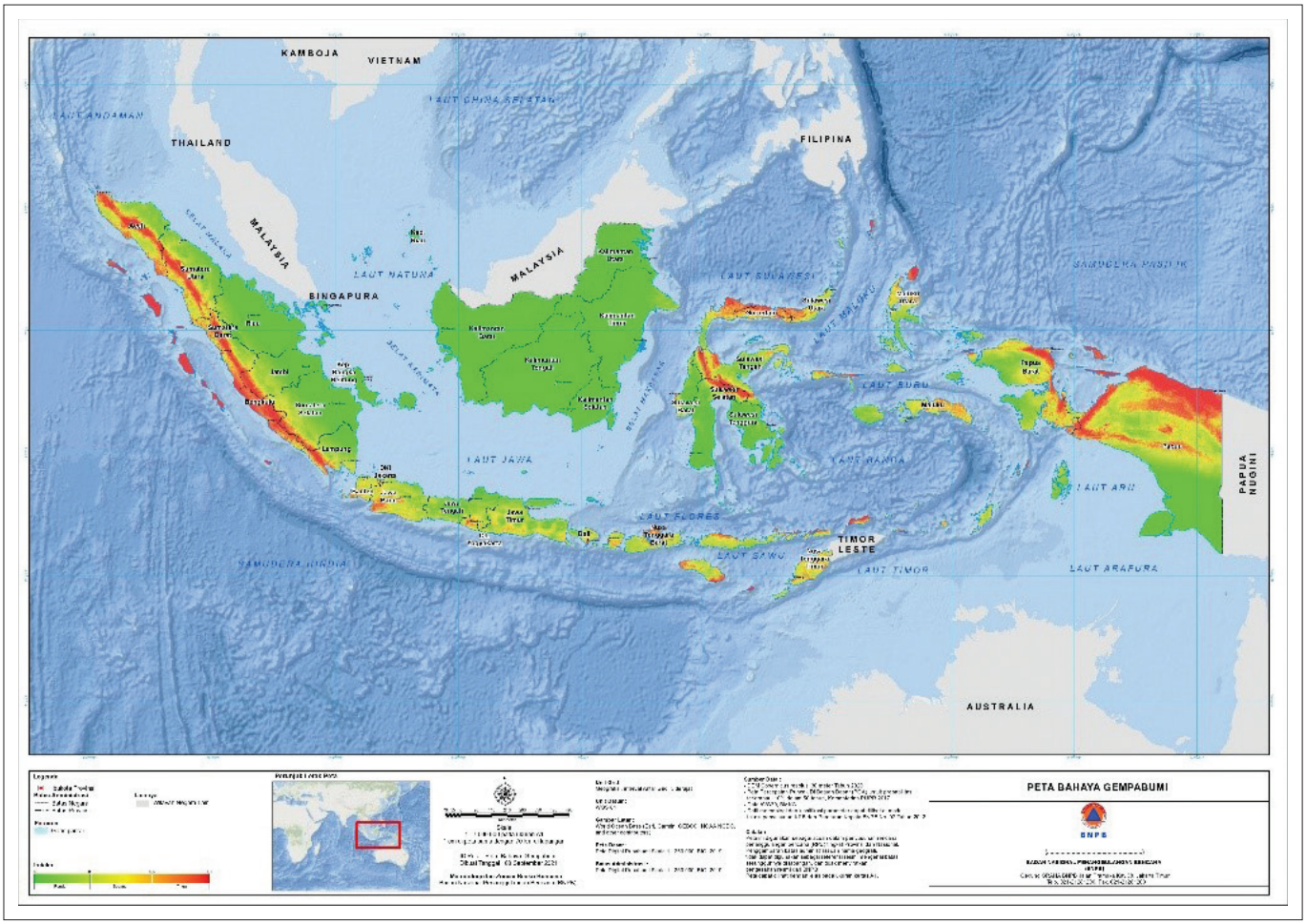
Study setting

The research was conducted in urban areas across Java Island, Indonesia – regions known for their high population density, increasing reliance on digital communication and persistent exposure to seismic hazards. Java is a key socio-economic hub and a focal point for national DRR efforts. Geologically, Java lies along the Sunda Megathrust, one of the most active seismic zones in Southeast Asia. As shown in Figure 2, much of Java – especially its southern coastal areas – is classified as high to very high risk for earthquake activity according to the national Earthquake Hazard Map published by BNPB. This underscores the urgency of studying disaster preparedness behaviours in this densely populated and hazard-prone region.

Study population and sampling strategy

The target population consisted of individuals from Generations Y (1981–1996) and Z (1997–2012) residing in urban areas of Java Island, Indonesia. These cohorts were selected because of their high digital fluency and frequent engagement with online disaster information platforms (We Are Social & Meltwater 2023). Participants were required to meet the following inclusion criteria: (1) reside in an urban district in Java, (2) be between 18 years old and 42 years old and (3) be active users of digital media (defined as usage at least once per week). Based on demographic data from Badan Pusat Statistik (BPS 2022), the estimated population of Gen Y and Z individuals living in urban Java falls between 25 and 30 million.

A purposive sampling strategy was employed to ensure that the study captured responses specifically from urban youth populations in disaster-prone areas – an audience identified as both digitally active and strategically important for disaster preparedness interventions (Etikan, Musa & Alkassim 2016). This approach enabled targeted



Source: Badan Nasional Penanggulangan Bencana (BNPB), 2021, *Peta Bahaya Gempabumi – Indonesia, Badan Nasional Penanggulangan Bencana*, viewed 21 October 2023, from https://bnpb.go.id

FIGURE 2: *Earthquake Hazard Map of Indonesia*, highlighting seismic risk zones across the archipelago. Java Island, the primary study area, appears in the centre-left, with extensive high-risk zones (in red and orange) along its southern coast.

recruitment of individuals with relevant demographic and contextual characteristics aligned with the study objectives. While probability-based techniques such as random or stratified sampling offer higher generalisability, they were not feasible because of access constraints, budget limitations and the absence of a centralised sampling frame for the target demographic.

As the sampling was non-probabilistic and exploratory in nature, formal statistical sample size formulas were not applied. Instead, sample size determination followed analytical guidelines for mediation analysis, which recommend a minimum of 10–20 cases per predictor variable (Hair et al. 2010). A total of 238 valid responses were collected, exceeding this threshold and ensuring adequate statistical power for the proposed model.

Instrumentation

A structured questionnaire was used to capture three main constructs:

1. Digital risk amplification (X): 9 items assessing trust in digital disaster sources, frequency of media use and interaction with visual or statistical disaster content.
2. Risk perception (Z): 4 items measuring perceived likelihood, severity and concern related to earthquake risks.
3. Earthquake preparedness (Y): 5 items focusing on self-reported actions, including evacuation planning, emergency supply readiness and simulation participation.

All items were measured using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The instrument was adapted from previously validated scales and administered in Bahasa Indonesia to ensure accessibility.

Validity and reliability

To ensure the robustness of the measurement instrument, both construct validity and reliability were evaluated. Construct validity was assessed using Pearson's product-moment correlation, with all item-total correlations exceeding $r > 0.361$ ($p < 0.05$), confirming convergent validity (Hair et al. 2010). Reliability was assessed using Cronbach's alpha, with all constructs meeting acceptable thresholds: digital risk amplification ($\alpha = 0.765$), risk perception ($\alpha = 0.675$) and earthquake preparedness ($\alpha = 0.799$). These values indicate that the internal consistency of the instrument was sufficient for further analysis (Nunnally & Bernstein 1994).

Data collection procedure

Data were collected over a 3-week period via an online questionnaire hosted on Google Forms. The survey was distributed using a multi-platform digital outreach strategy designed to engage digitally active urban youth in Java. The full set of platforms used included university mailing lists from three major urban universities, WhatsApp groups associated with student associations, alumni communities and disaster volunteer networks, as well as Instagram, where the link was shared through stories and posts by student influencers and academic clubs. Additional platforms included X (formerly Twitter), Telegram public channels, Facebook groups related to youth and disaster preparedness and several online forums hosted by local DRR communities.

These platforms were selected based on their high engagement rates among the target demographic and their accessibility within the urban context. Based on estimated distribution metrics (e.g. mailing list size, group membership counts and social media reach), approximately 950 to 1100 individuals were exposed to the survey invitation. A total of 238 valid responses were collected, yielding an estimated response rate of 21.6% to 25%. Participation was voluntary, anonymous and conditional upon digital informed consent obtained at the beginning of the survey.

Data analysis

Data were exported from Google Forms in Microsoft Excel (.xlsx) format and subsequently imported into SPSS version 26.0 for statistical analysis. Initial steps included data cleaning, removal of incomplete or duplicate entries and verification of outliers using standardised scores and boxplot analysis. Descriptive statistics were used to profile respondents and summarise construct responses. Bivariate regression analysis was conducted to examine the direct influence of digital risk amplification on both risk perception and preparedness. To evaluate the mediation effect, the study followed Baron and Kenny's (1986) three-step method and further tested the significance of the indirect effect using the Sobel test.

Prior to analysis, key statistical assumptions were tested to ensure the validity of regression-based mediation procedures. Normality was assessed using the Kolmogorov–Smirnov test with Monte Carlo simulation; multicollinearity was evaluated using variance inflation factor (VIF < 10); and heteroscedasticity was examined through scatterplots of standardised residuals. All assumptions were found to be satisfactorily met, affirming the suitability of the selected analytical approach.

Ethical considerations

Ethical clearance for this study was granted by the Research Ethics Committee of a public university in Western Jakarta under study approval number 11/75/H-SPK/IX/2024. Respondents were informed of the voluntary nature of the study and the right to withdraw at any time. All data were collected anonymously, stored securely and used solely for academic purposes. No personally identifiable information was recorded or analysed.

TABLE 1: Regression and mediation analysis results.

Path	B	SE	*t*	*p*
Digital risk amplification → risk perception	0.421	0.052	8.09	< 0.001
Risk perception → earthquake preparedness	0.365	0.061	5.98	< 0.001
Digital risk amplification → preparedness (direct)	0.128	0.074	1.74	0.084
Indirect effect via risk perception (Sobel test)	–	–	2.41	< 0.05

SE, standard error.

Results

Descriptive statistics

A total of 238 valid responses were analysed, with participants primarily representing Generation Z (64.3%) and Generation Y (35.7%). Most respondents had attained tertiary education and reported high engagement with digital platforms, including social media, disaster alert applications and news portals. The descriptive results showed moderately high average scores across all key constructs: digital risk amplification ($M = 3.92$, standard deviation [s.d.] = 0.61), risk perception ($M = 3.88$, s.d. = 0.67) and earthquake preparedness ($M = 3.56$, s.d. = 0.72). These findings suggest that the target demographic – digitally active urban Indonesians – demonstrated a reasonable level of hazard awareness and media interaction.

Regression and mediation analysis

To examine the hypothesised relationships, a series of linear regressions and mediation analyses were conducted using SPSS version 26.0. The first regression model indicated that digital risk amplification significantly predicted risk perception ($\beta = 0.421$, $p < 0.001$), supporting the idea that frequent exposure to risk-related content on digital platforms is positively associated with higher perceived seismic risk.

However, the direct effect of digital risk amplification on earthquake preparedness was not statistically significant ($\beta = 0.128$, $p = 0.084$), implying that information exposure alone is insufficient to trigger preparedness actions. In contrast, the path from risk perception to preparedness was statistically significant ($\beta = 0.365$, $p < 0.001$), confirming that heightened risk perception drives behavioural intentions.

A mediation analysis based on the Baron and Kenny (1986) framework, further supported by a Sobel test ($z = 2.41$, $p < 0.05$), demonstrated that risk perception fully mediated the relationship between digital amplification and preparedness (Table 1). The overall model explained 27.4% of the variance in earthquake preparedness ($R^2 = 0.274$), indicating a moderate effect size and the presence of other influencing factors beyond perception alone.

The strength of the relationship between digital risk amplification and risk perception ($\beta = 0.421$) indicates a

moderately strong predictive power, suggesting that digital content exposure significantly shapes how individuals cognitively assess seismic threats. In contrast, the non-significant direct path to preparedness highlights the critical role of psychological engagement in translating awareness into action. The mediation pathway, confirmed through the Sobel test, supports a fully mediated model where risk perception acts as the primary mechanism linking digital exposure to real-world behavioural intentions.

Discussion

The key contribution of this study lies in confirming that risk perception is a critical cognitive mediator between digital risk exposure and preparedness behaviour. Although digital platforms expose users to hazard information, preparedness behaviour is significantly more likely when users internalise this information as personal risk.

These findings empirically support the SARF, which posits that media channels can intensify or attenuate public responses to risk depending on the structure, frequency and emotional framing of content (Kasperson et al. 1988; Renn 2011). Digital media – particularly algorithm-driven platforms like TikTok and Instagram – can heighten perceived risk through repetitive exposure, emotive imagery and virality. However, as this study reveals, such amplification must be cognitively processed and internalised to influence behavioural outcomes.

Perceived risk alone is insufficient; it must be accompanied by perceived efficacy (i.e. belief that one can take meaningful action), response efficacy (i.e. belief that preparedness actions are effective) and access to actionable resources. These mechanisms align with core components of protection motivation theory (Rogers 1983), which suggests that motivation to act arises when individuals perceive both a credible threat and an effective means to respond. To achieve real behavioural change, risk communication strategies should not only amplify risk perception but also include clear, culturally relevant and achievable preparedness actions that reduce psychological barriers to action.

The lack of a direct relationship between digital amplification and preparedness echoes previous findings. Wendling, Radisch and Jacobzone (2013) observed that hurricane-related alerts in the United States increased awareness but failed to elicit action unless accompanied by high personal relevance. Similarly, Sun et al. (2025) warned that message fatigue and information overload can lead to fear fatigue, a psychological disengagement from repetitive warnings.

However, these studies were largely conducted in Western contexts and did not empirically examine the mechanisms through which digital communication influences disaster preparedness. This study extends prior work by focusing on a Southeast Asian high-risk population, employing a quantitative mediation model that integrates the SARF and the DOI theory. Moreover, it highlights the role of risk perception as a full mediator – an insight that is rarely tested using statistical modelling in disaster communication studies. By targeting Generations Y and Z in urban Indonesia, the study addresses an underrepresented demographic that is digitally active yet behaviourally passive in preparedness contexts.

This study also affirms key propositions of the DOI theory (Rogers 2003). While digital content may effectively trigger the initial stages of innovation adoption – namely awareness and persuasion – the progression to decision and implementation phases requires more than just exposure. It depends critically on risk salience, self-efficacy and the availability of clear, actionable preparedness steps. These dynamics are especially relevant in the Indonesian context, where digital literacy is rising but disaster preparedness remains uneven across regions (BNPB 2023).

Recent studies have emphasised that multi-platform engagement, interactive content and localised disaster education campaigns can significantly improve the uptake of protective behaviours (Roger et al. 2016; Shaw, Izumi & Shi 2018). For instance, the integration of gamified mobile applications, influencer-led campaigns and community-based digital outreach has shown promise in translating digital awareness into real-world preparedness (Nemeth et al. 2024). Moreover, the confirmation phase of DOI – where behavioural reinforcement occurs – is more likely when users receive positive feedback loops, such as peer sharing, virtual badges or success stories, that validate their actions. As such, digital risk communication must be complemented with design-thinking approaches that empower users to act, not just understand.

Moreover, this mediation effect appears consistent with patterns observed in other disaster-prone regions. Studies in the Philippines (Gaillard 2019) and India (eds. Thomas et al. 2020) similarly reported that digital exposure increased knowledge but did not consistently lead to preparedness, reinforcing the importance of targeted engagement over volume-based messaging.

Practical implications

The findings hold important implications for disaster risk communication in Indonesia and comparable settings. Firstly, disaster authorities such as BNPB and BMKG should move beyond mere dissemination of alerts and develop contextualised, persuasive content that enhances risk perception and empowers action. This could include narrative-based campaigns, gamified mobile apps and community-driven simulations.

Secondly, the risk of message fatigue must be actively mitigated. While sustained exposure to risk-related content can elevate risk perception and motivate preparedness, overly repetitive or alarmist messaging may lead to emotional desensitisation, cognitive overload or disengagement. Striking a balance requires strategic message design that reinforces key

preparedness behaviours without overwhelming audiences. Approaches such as rotating content formats, employing localised storytelling and leveraging trusted digital influencers can help sustain attention and trust while minimising psychological fatigue. Importantly, content should transition from problem-focused to solution-focused framing – offering simple, actionable steps that promote efficacy and reinforce progress. This aligns with the need to move from risk awareness to long-term adoption as emphasised in the implementation and confirmation stages of the DOI theory (Rogers 2003).

Thirdly, communication strategies should be platform-specific and generation-sensitive. Generations Y and Z consume information predominantly through visual and short-form media, so preparedness messages should be tailored accordingly – for example, through Instagram reels, TikTok videos and interactive mobile features.

Limitations and future research

While this study presents a robust mediation model, certain limitations must be noted. The cross-sectional design limits causal inference, and self-reported data may be subject to social desirability or recall biases. The use of purposive sampling, although justified, limits the generalisability of findings beyond the urban youth population.

Future research should explore longitudinal designs to assess changes in preparedness over time and in response to real-time media events. Integration of behavioural data, such as app usage metrics or emergency kit purchases, could validate self-reported measures. Qualitative studies may also unpack the emotional and psychological factors that influence digital engagement and hazard response.

Conclusion

This study examined the relationship between digital media exposure, risk perception and earthquake preparedness among digitally active members of Generations Y and Z in urban Indonesia. These cohorts were selected because of their high digital engagement and relevance to emerging disaster communication strategies. The findings revealed that digital risk amplification significantly influenced risk perception, but did not directly affect preparedness behaviours. Instead, risk perception emerged as a full mediator, suggesting that individuals only act upon digital disaster information when it is internalised as a personal and credible threat.

While the two generations share common patterns of digital usage, this study did not compare them analytically. Future research could explore whether intergenerational differences in media literacy, emotional processing or trust in institutions influence how each group responds to risk communication and preparedness messaging.

In relation to the first objective, the study confirmed that frequent exposure to risk-related content via digital platforms enhances perceived seismic risk, supporting the assumptions of the SARF. For the second objective, it demonstrated that risk perception is a strong predictor of preparedness, indicating that cognitive appraisal plays a central role in motivating protective actions. Lastly, addressing the third objective, the study provided empirical evidence that risk perception fully mediates the relationship between digital media exposure and earthquake preparedness, aligning with both SARF and the DOI theory.

These findings highlight the importance of not just disseminating information through digital channels but also fostering meaningful risk perception to encourage proactive disaster behaviour. The study contributes to both theory and practice by offering a mediated framework for understanding how digital communication translates into preparedness among younger populations in disaster-prone regions.

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Competing interests

The authors reported that they received funding from Universitas Dian Nusantara, which may be affected by the research reported in the enclosed publication. The author has disclosed those interests fully and has implemented an approved plan for managing any potential conflicts arising from their involvement. The terms of these funding arrangements have been reviewed and approved by the affiliated university in accordance with its policy on objectivity in research.

Authors' contributions

S.H. conceptualised the study, designed the methodology and supervised the overall research process. C.S. assisted in coordinating data collection, conducting the statistical analysis and interpreting the findings. N.A.D. contributed to the literature review, refinement of the discussion and conclusion sections and preparation of the manuscript draft. All authors read and approved the final version of the manuscript and met the authorship criteria as outlined by the journal.

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Data availability

The data that support the findings of this study are available from the corresponding author, S.H., upon reasonable request. The dataset includes anonymised survey responses and a coding key for the questionnaire items.

Disclaimer

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