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Youth on the Frontlines: A Study of Volunteering in Flood Disaster Relief Efforts

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Abstract Youth volunteering is crucial during and after disasters, providing essential manpower to support affected communities. In Malaysia, however, youth participation in volunteer activities remains lower than that of adults. This study investigates the factors influencing Malaysian youths' volunteering behavior in flood disaster relief using a cross-sectional survey of 212 respondents, collected through a structured, self-administered questionnaire. Data were analyzed with SmartPLS version 4 and SPSS version 29. The results reveal that social capital positively shapes attitudes, subjective norms, and perceived behavioral control. Furthermore, attitudes, perceived behavioral control, altruism, personal identity, and religiosity significantly predict volunteering intention, which in turn drives actual volunteering behavior. Notably, subjective norms and perceived moral obligation were not significant predictors of intention. By extending the Theory of Planned Behavior, this study provides an in-depth understanding of youth volunteering in disaster contexts and offers actionable insights for policymakers, NGOs, and youth organizations to design targeted strategies that enhance youth engagement in flood relief efforts.

Keywords: flood, disaster, disaster risk reduction, volunteerism, youth

1. INTRODUCTION

Natural hazards are sudden and extreme events that occur in nature, causing significant harm to people, property, and the environment. These include earthquakes, floods, hurricanes, droughts, wildfires, and volcanic eruptions. The scale, frequency, and severity of their impacts

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vary depending on the type of hazard and the vulnerability of the affected areas. Among these natural hazards, floods are particularly destructive and have become increasingly frequent in recent decades (Cea & Costabile, 2022). Globally, floods account for more than 44% of major disasters, with severe consequences for regions facing high socioeconomic vulnerability (Merz et al., 2021). According to the Emergency Events Database (EM-DAT, 2022), floods caused approximately 7,954 deaths and an estimated US\$44.9 billion in economic losses between 2002 and 2022. In response to such catastrophic events, effective flood disaster relief is essential. It requires coordinated efforts among government agencies, humanitarian organizations, and local communities. Relief operations typically involve the rapid deployment of medical aid, shelter, food, and clean water to reduce immediate suffering. Long-term recovery focuses on rebuilding infrastructure, restoring livelihoods, and strengthening community resilience.

The modern disaster management approach is guided by the disaster management cycle, which consists of four key components: mitigation, preparedness, response, and recovery. This approach emphasizes Disaster Risk Reduction (DRR) and the enhancement of community resilience (Rumpa et al., 2023). Flood disaster relief efforts are primarily associated with the response phase, where immediate actions, such as search and rescue operations, the provision of emergency shelters, medical care, food, and clean water, are undertaken to save lives and minimize the disaster's impact. These relief activities often involve volunteer workers representing various organizations who provide essential assistance, including rescuing trapped individuals, supporting injured and displaced persons, and helping to rebuild critical infrastructure (Sodhi, 2016). In many cases, citizens are the first to arrive at disaster sites. With adequate skills and knowledge, they can play vital roles and make significant contributions to relief operations (Aminizade et al., 2017). Over the past decade, youths have increasingly been recognized as key agents of change in addressing climate change and, more recently, in advancing disaster risk reduction efforts (Pickering et al., 2022).

The Sendai Framework for Disaster Risk Reduction (SFDRR) recognizes youth as agents of change, emphasizing that laws, educational curricula, and national practices should create opportunities for their active involvement in disaster risk reduction (Shah et al., 2020a). Youth participation in disaster volunteering is essential, as additional manpower is often required to support victims during emergencies (Mohd Arshad et al., 2023). However, a report by the Institute for Youth Research Malaysia (2021) revealed that only 27.1% of Malaysian youths engage in volunteering activities. This low participation rate suggests limited awareness and engagement with volunteerism among young people. Similarly, Rabun et al. (2017) found that although youths are exposed to volunteerism, the number of active participants remains small. In contrast, retirees represent the majority of volunteers in Malaysia (Sallam et al., 2018). Shi et al. (2018) further noted that older individuals tend to be more willing to volunteer in emergencies due to their greater experience and confidence. Ridzuan et al. (2022) emphasized that effective flood disaster management depends on the active participation of youth in developing comprehensive plans that address national needs. Nevertheless, many youths have yet to fully utilize their potential and unique position to contribute to flood disaster relief efforts.

The Theory of Planned Behavior (TPB) is widely used by scholars to predict and explain human behavior (Ng, 2022). According to TPB, an individual's behavior is directly influenced

by their intention to perform that behavior, which is shaped by three key determinants: Attitude (AT), Subjective Norms (SN), and Perceived Behavioral Control (PBC) (Ajzen, 1991). Although TPB has been extensively applied to understand a wide range of behaviors, including Volunteering Intention (VI) and Volunteering Behavior (VB) (e.g., Tiraieyari et al., 2019; Zhong et al., 2022), recent studies (e.g., Mouloudj & Bouarar, 2023) have highlighted its limitations in fully explaining the complexity of prosocial actions, particularly in dynamic and high-stakes contexts such as disaster relief volunteering. To overcome these limitations, researchers have expanded the TPB framework by incorporating additional constructs, such as descriptive norms and moral norms (Gao et al., 2017), as well as trust and fear (Bouarar et al., 2021), to strengthen the model's explanatory and predictive power.

However, a notable gap remains in the existing literature. Most TPB-based studies on disaster volunteering have been conducted outside Malaysia and have primarily focused on non-youth or general volunteer populations, as well as on disaster preparedness rather than active disaster relief (e.g., Prashar et al., 2024; Cahigas et al., 2023; Najafi et al., 2022). In contrast, research that specifically examines youth engagement in flood disaster relief, particularly in flood-prone regions, remains limited. Within the Malaysian context, empirical studies on emergency volunteering are still scarce. Existing research has mainly explored aspects such as volunteer quality of life (Chen et al., 2021), motivational factors (Hizazi et al., 2023), and social capital during recovery (Chan et al., 2018). However, few of these studies have employed the TPB as their theoretical foundation or investigated the behavioral determinants underlying youth participation in flood disaster relief efforts.

Moreover, although youth engagement in DRR has been widely acknowledged for its potential benefits (Muzenda-Mudavanhu, 2016), limited research has examined youths as active agents of change, particularly in post-disaster relief contexts such as flooding. While some studies (e.g., Ma et al., 2021; Peek, 2008) have explored volunteer willingness in disaster preparedness, none have specifically investigated youth volunteering behavior in flood disaster relief using an extended TPB framework.

This study offers an original contribution by addressing the existing research gap through the application of an extended TPB framework to examine the behavioral motivations and predictors of Malaysian youths' involvement in flood disaster relief. By incorporating contextually relevant factors into the TPB, this research seeks to provide a more nuanced and locally grounded understanding of youth volunteering behavior. It thereby contributes both theoretically to the advancement of TPB in disaster contexts and practically to the design of policies and programs that promote youth engagement in emergency relief efforts. Understanding the motivations behind volunteering intention enables organizations to manage volunteers more effectively, ensuring that the benefits of volunteering outweigh potential challenges for both individuals and communities. The findings of this study are expected to provide valuable insights for the Ministry of Youth and Sports and the Malaysian Youth Council, particularly in identifying the key factors that encourage youths to contribute their time and skills to future volunteer initiatives. Furthermore, these findings will support efforts to strengthen volunteer recruitment, enhance networking opportunities, and promote organizations that foster a culture of volunteerism.

2. LITERATURE REVIEW

Volunteering is defined as a voluntary act performed for the benefit of others, motivated by moral obligation or a genuine willingness to help, undertaken during one's free time, and without expectation of financial reward (Reuveni & Werner, 2015). Volunteers are vital assets in emergency and disaster situations, contributing their time, knowledge, skills, and resources to support affected communities (Ozel & Sezen, 2018). They play crucial roles in rescue operations and provide essential assistance to government agencies (Heidarpour et al., 2021). In many developed countries, disaster and emergency management systems rely heavily on volunteers who work under professional supervision and in coordination with official organizations (Grant et al., 2019). Looking ahead, volunteers are expected to assume an even greater role in disaster response and management efforts (Whittaker et al., 2015; McLennan et al., 2016). Despite their significant contributions, not all youths demonstrate the same level of interest or engagement in volunteering (Demirbilek & Öztürk, 2023). Some perceive volunteering as unappealing or time-consuming (Kesgin, 2016). Others encounter barriers such as family obligations, time constraints, financial limitations, social responsibilities, health issues, and cultural expectations. Consequently, volunteering is often not prioritized among younger generations (Demirbilek & Öztürk, 2023).

2.1 Social Capital and Attitude towards Volunteering

Social capital refers to the trust and reciprocity that develop when members of a community collaborate toward a common goal (Bailey et al., 2003). According to Jia et al. (2020), social capital comprises three dimensions: structural, cognitive, and relational. The structural dimension relates to the networks and participation of organizations and individuals; the cognitive dimension concerns shared values, beliefs, and norms among members; and the relational dimension emphasizes the strength of interpersonal relationships within and between organizations. In the context of disaster management, research indicates that social capital and strong social ties are often more effective than government aid in helping victims cope with and recover from disasters (Bhandari, 2014; Aldrich, 2012). Yao et al. (2021) found that individuals are more likely to support organizations that actively assist disaster victims, while Cahigas et al. (2023) highlighted the crucial role of well-established organizations in fostering positive attitudes toward volunteering. Therefore, social capital is posited to positively influence youths' Attitude (AT) toward volunteering in flood disaster relief by promoting trust, reciprocity, and strong community connections. A shared sense of belonging and collective purpose can motivate youths to participate in volunteer activities, as they feel more connected to their communities and empowered to contribute meaningfully.

H1: Social capital positively influences attitudes toward volunteering.

2.2 Social Capital and Subjective Norms

Ajzen (1991) associated Subjective Norms (SN) with two key elements: societal pressure and social influence. Organizations and their members, who share common principles, missions, and visions, can cultivate positive SN by promoting shared expectations and collective goals (Ong et al., 2021). Within such environments, members often hold similar interests and concerns, which strengthen group cohesion and influence behavioral conformity (Jiang & Ritchie, 2017). Social networks play a vital role in facilitating the rapid exchange of information and the mobilization of financial and physical resources during disasters (Chan et al., 2018). In this context, social capital is commonly categorized into three forms: bonding, bridging, and linking (Grootaert et al., 2004). Bonding social capital refers to strong internal ties within a community, such as those among family members, close friends, or individuals with similar backgrounds (Putnam, 2000). Bridging social capital involves connections between people from different ethnic, geographical, or occupational groups, extending beyond the immediate community (Szreter & Woolcock, 2004). Linking social capital represents relationships between communities and formal institutions, such as local governments and agencies (Grootaert et al., 2004; Woolcock & Narayan, 2000). Cahigas et al. (2023) emphasized that social capital shapes subjective norms, as members' perceptions are deeply influenced by the culture and norms of their organizations. Based on this discussion, it is posited that social capital positively influences subjective norms, fostering trust, shared values, and mutual support within a community. When individuals identify with these shared principles, they are more likely to align their behaviors with the expectations and norms upheld by their community.

H2: Social capital positively influences subjective norms.

2.3 Social Capital and Perceived Behavior Control

Perceived Behavioral Control (PBC) refers to an individual's perception of the ease or difficulty of performing a particular behavior (Ajzen, 1991). Social capital can positively influence this perception, as members of a community or organization share resources, knowledge, and support to reduce the risks and impacts of natural disasters (Zaremohzzabieh et al., 2021). In disaster situations, social capital is often a critical survival asset, especially before external assistance becomes available. It enables communities to cope, recover, and sustain essential functions during crises (Chan et al., 2018). Jiang and Ritchie (2017) highlighted that collaborative environments strengthen social relationships, thereby enhancing social capital and facilitating effective resource sharing. Based on this understanding, it is posited that social capital positively influences PBC by increasing individuals' confidence in their ability to perform specific actions. When community members engage in collective efforts and mutual support, they experience reduced barriers and greater control over their capacity to respond effectively in disaster situations.

H3: Social capital positively influences perceived behavioral control.

2.4 Attitude and Volunteering Intention

Attitude is defined as “the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question” (Ajzen, 1991, p. 188). In the context of disaster relief, individuals’ attitudes can be shaped positively or negatively when deciding whether to volunteer (Shah et al., 2020b). Volunteers play a crucial role in supporting organizations through activities such as distributing relief supplies, assisting affected victims, and rebuilding infrastructure (Chen et al., 2021). Empirical evidence consistently supports the influence of attitude on volunteering intention. For instance, Sallam et al. (2021) found that attitude significantly affects youths’ intentions to volunteer in Yemen. Similarly, Kim et al. (2022) reported that medical and nursing students with positive attitudes were more willing to care for COVID-19 patients. Mouloudj and Bouarar (2023) also demonstrated that students with favorable attitudes toward volunteering were more likely to engage in such activities compared to those with negative or neutral attitudes. Based on these findings, this study proposes the following hypothesis:

H4: Attitude toward volunteering positively influences volunteering intention.

2.5 Subjective Norms and Volunteering Intention

Subjective norms are influenced by various sources, including disaster-related news, social media, community networks, family, and friends. Individuals often choose to volunteer or make donations when those around them do the same, motivated by concerns about reputation and perceived social benefits (Jaeger & van Vugt, 2022). People tend to value their reputation because their actions are subject to social judgment, either positively or negatively (Cahigas et al., 2023). Although the decision to volunteer is ultimately personal, referent groups, such as family, peers, and community members, play a significant role in shaping one’s intentions (Mouloudj & Bouarar, 2023). Empirical studies support this relationship. Bekkers (2007) found that volunteering behaviors are often transmitted intergenerationally through parents and family members. In China, Law and Shek (2009) demonstrated that adolescents’ families positively influenced their volunteering intentions and behaviors. Similarly, Ridzuan et al. (2024a) reported that subjective norms significantly predicted flood preparedness intention among tenants in Malaysia’s East Coast Region. Other studies (e.g., Sallam et al., 2021; Tiraeyari et al., 2019; Zhong et al., 2022) also found that subjective norms positively influence individuals’ intention to volunteer. Based on these findings, this study proposes the following hypothesis:

H5: Subjective norms positively influence volunteering intention.

2.6 Perceived Behavioral Control and Volunteering Intention

Perceived Behavioral Control is defined by Ajzen (1991, p. 183) as “the person’s perception of the ease or difficulty of performing the behavior of interest.” Ajzen (1991) further emphasized that individuals who believe they possess the necessary opportunities and

resources to engage in a specific behavior are more likely to develop strong intentions to perform that behavior. Accordingly, individuals who feel capable and confident in their ability to volunteer are more inclined to participate in and support volunteering activities (Rasouli & Hamdi, 2020). Empirical evidence supports this relationship. Lee et al. (2017) found that perceived behavioral control significantly influenced individuals' willingness to participate in landslide-related volunteer campaigns. Similarly, Southby et al. (2019) identified personal resources as both barriers and enablers to volunteering. Previous studies (e.g., Bang et al., 2014; Sallam et al., 2021; Tiraieyari et al., 2019; Zhong et al., 2022) also confirmed that perceived behavioral control positively influences individuals' intentions to volunteer. Based on these findings, this study proposes the following hypothesis:

H6: Perceived behavioral control positively influences volunteering intention.

2.7 Altruism and Volunteering Intention

Altruistic behavior refers to actions undertaken to benefit others, often at a personal cost to the helper (Fehr & Fischbacher, 2003). Such behaviors are characterized by four key features: (1) they benefit others, (2) they are voluntary, (3) they are intentional and purposeful, and (4) they are performed without the expectation of personal gain (Piliavin & Charng, 1990). An individual's behavior can thus be understood as a reflection of their altruistic values (Landon et al., 2018). Wu et al. (2022) observed that individuals who display strong altruistic tendencies often act with empathy and concern for others, contributing to the promotion of social harmony. In the context of volunteerism, Han et al. (2020) found that psychological resilience and personal norms directly influence altruistic intentions among travel volunteers. Similarly, Jiranek et al. (2013) emphasized that incorporating social justice considerations within the TPB underscores the significance of altruistic motives in shaping volunteering intentions. While TPB explains prosocial behaviors such as organ donation, environmental protection, and ethical consumption, altruism has also been identified as a key motivational factor that enhances individuals' willingness to participate in such behaviors (Dennis & Buchholtz, 2009). Therefore, it is posited that altruism positively influences volunteering intention in flood disaster relief efforts by driving individuals to assist those affected out of genuine compassion and moral responsibility. Individuals motivated by altruistic values are more likely to contribute their time, skills, and resources to support disaster-affected communities, reflecting their intrinsic concern for the welfare of others.

H7: Altruism positively influences volunteering intention.

2.8 Personal Identification and Volunteering Intention

Personal identity is regarded as a psychological construct that significantly influences behavior (Armitage & Conner, 2001). In their study on blood donation, a prosocial act comparable to volunteering, as it benefits others, Armitage and Conner (2001) advocated for the inclusion of personal identity within the TPB model. In TPB-based studies, personal identity is typically assessed in relation to the specific behavior under investigation. For

instance, participants have been asked to reflect on their identity as blood donors (Armitage & Conner, 2001) or as cautious pedestrians (Evans & Norman, 2003). Reuveni and Werner (2015) investigated factors influencing adolescents' willingness to volunteer with elderly individuals and found that personal identity significantly and positively affected volunteering intention. This suggests that when individuals perceive volunteering as part of who they are, they are more inclined to engage in such behaviors. Accordingly, it is proposed that personal identification positively influences volunteering intention in flood disaster relief efforts by encouraging individuals to view volunteering as an integral aspect of their self-concept. When people feel personally connected to a cause or community, they are more likely to act in alignment with their values and sense of social responsibility. This internalized connection fosters sustained motivation to volunteer, particularly in times of crisis, such as during flood disasters.

H8: Personal identification positively influences volunteering intention.

2.9 Perceived Moral Obligation and Volunteering Intention

Perceived moral obligation is defined as “an individual’s perception of the correctness or incorrectness of performing a behavior” (Conner & Armitage, 1998, p. 1441). Volunteering, in this context, is understood as a voluntary action undertaken for the benefit of others, motivated by a moral duty or a genuine willingness to help, performed during one’s free time, and without expectation of reward (Reuveni & Werner, 2015). Scholars have long sought to extend the TPB by integrating additional variables that enhance its predictive power (Werner, 2003). One such variable, perceived moral obligation, has been shown to improve the model’s ability to predict behavioral intentions (Werner & Mendelson, 2001). According to Reuveni and Werner (2015), perceived moral obligation represents an internalized moral value that guides individuals in distinguishing right from wrong.

Empirical evidence supports the significance of moral obligation in predicting volunteering behavior. Warburton and Terry (2000), in their study of elderly individuals, identified perceived moral obligation as the strongest predictor of willingness to volunteer. Similarly, Beck and Ajzen (1991) found that moral obligation exerts a significant direct influence on behavioral intention. Hyde and Knowles (2013) also reported that moral obligation positively affects students’ intention to engage in community volunteering. More recently, Mouloudj and Bouarar (2023) demonstrated that students who perceive volunteering as an ethical duty are more inclined to participate in such activities. Based on these findings, this study posits that perceived moral obligation positively influences youths’ intention to volunteer in flood disaster relief efforts, as individuals who view helping others as a moral responsibility are more likely to take action in times of crisis.

H9: Perceived moral obligation positively influences volunteering intention.

2.10 Religiosity and Volunteering Intention

In this study, the term religion refers to an institution that provides individuals with knowledge, practices, and belief systems (Meade, 2012). Religiosity, from a scholarly perspective, reflects the degree of an individual's religious commitment and the importance they place on their religious beliefs and practices (Voas, 2007). The influence of religion and spirituality on human behavior has become an important area of academic inquiry (Harcrow, 2010), with growing attention to their effects on psychological and behavioral outcomes (Agorastos et al., 2014; Brewer et al., 2015). Religion has also been recognized as a key determinant of volunteering behavior (Gray et al., 2012). Although variations exist across religious types and denominations, most religions promote altruism, helping behavior (Krause, 2015), and cooperation among community members (Coe et al., 2015). Empirical studies (e.g., Sallam et al., 2018; Taniguchi & Thomas, 2011) consistently show that religiosity positively influences individuals' intentions to volunteer. Based on this evidence, it is proposed that religiosity positively affects youths' intention to volunteer in flood disaster relief efforts, as stronger religious commitment may encourage individuals to act in service to others during times of crisis.

H10: Religiosity positively influences volunteering intention.

2.11 Volunteering Intention and Volunteering Behavior

Behavioral intention refers to an individual's motivation and tendency to perform a specific behavior, serving as the most immediate determinant of that behavior. However, intention alone does not always guarantee that the behavior will occur. It reflects an individual's willingness to invest effort, such as time, energy, and resources, to engage in a particular action. The stronger the behavioral intention, the higher the likelihood that the behavior will be performed (Hu et al., 2023). Empirical evidence from Hu et al. (2023) showed a significant positive relationship between college students' volunteer service intentions and their actual volunteer behaviors. These findings are consistent with Ajzen's (1991) TPB, which posits that behavioral intention is the most proximal and reliable predictor of actual behavior.

H11: Volunteering intention positively influences volunteering behavior.

3. METHODOLOGY

3.1 Research Design

This study adopts a quantitative, cross-sectional design, which is well-suited for investigating associations between variables at a single point in time. This study employs a structured, self-administered questionnaire, grounded in the extended TPB framework. This framework, shaped by deductive reasoning, allows for hypothesis testing with numerical data and reflects a positivist epistemological stance.

3.2 Measurement

This study employed Rodell's (2013) scale to assess volunteering behavior during flood disasters. Social capital was measured using eight items adapted from Cahigas et al. (2023). The constructs of attitude toward volunteering, subjective norms, perceived behavioral control, and volunteering intention were measured using items adapted from Mouloudj and Bouarar (2023). Altruism was assessed using a scale adapted from Jin et al. (2020), while personal identity, perceived moral obligation, and religiosity were measured using scales adapted from Armitage and Conner (2001), Werner and Mendelson (2001), Freiheit et al. (2006), and Hernandez (2011), respectively. The questionnaire was initially developed in English and later translated into Bahasa Malaysia using a forward-backward translation procedure to ensure linguistic and conceptual equivalence. All exogenous variables were measured on a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Meanwhile, the endogenous variables, volunteering intention and volunteering behavior, were measured on a seven-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"). Table 1 presents a summary of the measurement items used in this study.

Table 1. Measurement items

No.	Constructs	No. of Items	Source
1.	Volunteering Behavior	5	Rodell (2013).
2.	Social Capital	8	Cahigas et al. (2023)
3.	Attitude toward volunteering	3	Mouloudj & Bouarar (2023).
4.	Subjective Norms	3	Mouloudj & Bouarar (2023).
5.	Perceived Behavioral Control	3	Mouloudj & Bouarar (2023).
6.	Cognitive Rigidity (SDB)	3	Oreg (2003).
7.	Volunteering Intention	3	Mouloudj & Bouarar (2023).
8.	Altruism	3	Jin et al. (2020).
9.	Personal Identity	8	Armitage & Conner (2001).
10.	Perceived moral obligation	3	Werner & Mendelson (2001)
11.	Religiosity	5	Daud et al. (2022).
	Total	47	

3.3 Sampling and Data Collection Procedure

This study focused on individuals residing in flood-prone areas in Malaysia, specifically targeting Malaysian youths aged 18 to 40 years. The age range aligns with the Youth Societies and Youth Development Act 2007, which defines youth as a person not older than 40 years (Ubaidillah et al., 2022; Sharif & Naghavi, 2020; Mohd Zin et al., 2020). Participants aged 18 and above were included because, under Malaysian law, 18 is the age of majority, when individuals can legally provide informed consent and make independent decisions. Restricting participation to those within this age range ensured valid and autonomous participation. To confirm eligibility, the survey included a filtering question to ensure that only youths living in flood-prone areas were able to participate. The minimum required sample size was calculated using G*Power 3.1.9.7. Following Gefen et al. (2011), with a statistical power of 0.80, a medium effect size, and a significance level of $p = 0.05$, the analysis indicated that at least 144 respondents were required for a model with eight predictors. The actual sample size was 212 respondents, exceeding the minimum requirement and ensuring adequate statistical power. A convenience sampling technique was employed to recruit participants who were easily

accessible and willing to take part in the study. Data were collected through an online survey distributed via social media platforms such as Facebook and WhatsApp groups. At the beginning of the questionnaire, respondents were informed that their participation was voluntary, that there were no right or wrong answers, and were encouraged to answer honestly to ensure data accuracy and reliability.

3.4 Data Analysis

Data were analyzed using SmartPLS version 4 and SPSS version 29. Following Hair et al. (2019), Partial Least Squares Structural Equation Modeling (PLS-SEM) is appropriate for assessing the effects of independent variables on dependent variables and exploring interrelationships among constructs. PLS-SEM is particularly suitable for predictive and exploratory studies that aim to develop rather than confirm existing theories. Since this study examines the predictors of youth participation in disaster relief volunteering, a relatively underexplored area, PLS-SEM provides the necessary flexibility for model specification and theory development. Additionally, SPSS was used to analyze and summarize the demographic characteristics of the respondents.

4. RESULTS

4.1 Demographic Profile of the Respondents

Table 2 presents the demographic profile of the respondents. The majority of respondents are female (58.5%), while males account for 41.5%. In terms of age distribution, the largest group falls within the 21–29 years category (59.9%), whereas the smallest group is aged 18–20 years (16.1%). Regionally, the Central Region (Selangor, Kuala Lumpur, Putrajaya, and Negeri Sembilan) records the highest representation at 37.3%, while Sarawak has the lowest at 9.4%. Regarding living areas, half of the respondents (50.0%) reside in urban areas, whereas only 9.9% live in rural areas. In terms of educational attainment, the majority hold undergraduate degrees (75.5%), followed by postgraduate qualifications (3.8%). Lastly, the largest proportion of respondents reports a monthly household income below RM5,000 (60.8%), while only 4.7% earn RM15,001 and above.

4.2 Measurement Model

4.2.1 Reliability and Convergent Validity Analyses

Table 3 presents the constructs, indicators, outer loadings, composite reliability (CR), and average variance extracted (AVE) for all variables in the study. The outer loading represents the strength of the relationship between each indicator and its corresponding construct. All outer loadings in this study exceed the recommended threshold of 0.50, indicating satisfactory indicator reliability and good measurement validity. CR assesses the internal consistency of each construct. According to Hair et al. (2019), a CR value above 0.70 suggests that the

construct consistently measures the intended concept. In this study, all constructs meet or exceed the 0.70 criterion, confirming good internal consistency.

The AVE measures the amount of variance captured by a construct's indicators relative to the variance caused by measurement error. A minimum AVE value of 0.50 is recommended, indicating that more than half of the variance in the indicators is explained by the construct (Hair et al., 2019). In this study, all constructs exceed the 0.50 threshold, demonstrating adequate convergent validity. Items such as PI1, PI3, and PI5 were removed due to Heterotrait-Monotrait ratio (HTMT) issues, which suggest excessive similarity between constructs. Removing these items improved the model's discriminant validity and ensured that each construct was conceptually distinct and statistically reliable.

4.2.2 Discriminant Validity

Table 4 presents the HTMT values for all constructs in the study. HTMT is used to assess discriminant validity, which determines whether each construct is conceptually distinct from the others. According to Franke and Sarstedt (2019), an HTMT value below 0.90 indicates acceptable discriminant validity. Values exceeding this threshold suggest that two constructs may be too highly correlated, raising concerns about multicollinearity. As shown in Table 4, all HTMT values are below 0.90, confirming that the constructs are adequately discriminated from one another and that the model does not exhibit multicollinearity issues.

Table 2. Demographic profile of the respondents

	Frequency	Percentage (%)
Gender		
Male	88	41.5
Female	124	58.5
Age		
18-20 Years Old	34	16.1
21-29 Years Old	127	59.9
30-40 Years Old	51	24.0
Region		
Central Region (Selangor, KL, Putrajaya, NS)	79	37.3
Southern Region (Johor, Malacca)	21	9.9
Northern Region (Perlis, Kedah, Penang, Perak)	24	11.3
East Coast Region (Pahang, Kelantan, Terengganu)	46	21.7
Sabah	22	10.4
Sarawak	20	9.4
Living Areas		
Urban	106	50.0
Semi Urban	85	40.1
Rural	21	9.9
Highest Educational Attainment		
School (SPM, STPM)	44	20.8
Undergraduate (Diploma, Degree)	160	75.5
Postgraduate (Master, PhD)	8	3.8
Household Monthly Income		
Below RM 5000	129	60.8
RM 5001 - 10 000	55	25.9
RM 10 001 - 15 000	18	8.5
RM 15 001 and above	10	4.7

Table 3. The convergent validity

Constructs	Indicators	Outer Loading	CR	AVE
VB	VB1	0.951	0.979	0.905
	VB2	0.953		
	VB3	0.960		
	VB4	0.951		
	VB5	0.941		
VI	VI1	0.967	0.977	0.934
	VI2	0.969		
	VI3	0.964		
AT	AT1	0.932	0.962	0.895
	AT2	0.962		
	AT3	0.944		
SN	SN1	0.933	0.955	0.877
	SN2	0.941		
	SN3	0.935		
PBC	PBC1	0.927	0.935	0.827
	PBC2	0.869		
	PBC3	0.931		
ALT	ALT1	0.926	0.946	0.853
	ALT2	0.930		
	ALT3	0.915		
PI	PI2	0.867	0.928	0.719
	PI4	0.842		
	PI6	0.789		
	PI7	0.871		
	PI8	0.869		
PMO	PMO 1	0.891	0.944	0.850
	PMO 2	0.949		
	PMO 3	0.924		
REL	REL1	0.777	0.939	0.719
	REL2	0.871		
	REL3	0.822		
	REL4	0.896		
	REL5	0.833		
	REL6	0.881		
SC	SC1	0.622	0.930	0.625
	SC2	0.797		
	SC3	0.774		
	SC4	0.873		
	SC5	0.796		
	SC6	0.760		
	SC7	0.811		
	SC8	0.866		

Note: Items such as PI1, PI3, and PI5 were deleted due to HTMT (Heterotrait-Monotrait ratio) issues.

Table 4. The discriminant validity

	ALT	AT	PBC	PI	PMO	REL	SC	SN	VB	VI
ALT										
AT	0.544									
PBC	0.820	0.654								
PI	0.899	0.639	0.858							
PMO	0.692	0.367	0.576	0.783						
REL	0.675	0.771	0.713	0.784	0.579					
SC	0.676	0.708	0.761	0.776	0.553	0.722				
SN	0.758	0.592	0.748	0.830	0.721	0.681	0.733			
VB	0.702	0.558	0.715	0.754	0.536	0.663	0.667	0.661		
VI	0.842	0.711	0.853	0.899	0.606	0.787	0.768	0.763	0.768	

4.2.3 Common Method Variance

Table 5 presents the results of the Common Method Variance (CMV) analysis, which evaluates the impact of a marker variable on the model's relationships and identifies potential common method bias. Common method bias occurs when measurement errors arise due to the use of a single data collection method, such as a survey, across multiple constructs. This bias can distort variable relationships and lead to inaccurate conclusions. For Attitude (AT), Subjective Norms (SN), Volunteering Intention (VI), and Volunteering Behavior (VB), the changes in R^2 values were below the 9% threshold proposed by Lindell and Whitney (2001), indicating that these constructs met the CMV requirement. However, SN and Perceived Behavioral Control (PBC) recorded R^2 changes of 11.4% and 16.5%, respectively, exceeding the acceptable threshold and suggesting potential CMV concerns. To address this, a marker variable was included in the analysis to control for bias in SN and PBC. This adjustment reduced the potential influence of shared measurement errors, thereby improving the validity and reliability of the model's results.

Table 5. Common method variance

	AT	SN	PBC	VI	VB
R^2 without Marker Variable	0.438	0.458	0.473	0.814	0.555
R^2 with Marker Variable	0.450	0.509	0.551	0.815	0.556

Table 6 presents the hypothesis testing results for the structural model, showing that most relationships are significant with strong effects. Hypotheses H1 ($SC \rightarrow AT$, $\beta = 0.662$, $p = 0.000$), H2 ($SC \rightarrow SN$, $\beta = 0.551$, $p = 0.000$), and H11 ($VI \rightarrow VB$, $\beta = 0.745$, $p = 0.000$) demonstrate large effect sizes ($f^2 > 0.35$) and are supported. Similarly, H3 ($SC \rightarrow PBC$, $\beta = 0.532$, $p = 0.000$), H4 ($AT \rightarrow VI$, $\beta = 0.139$, $p = 0.001$), H6 ($PBC \rightarrow VI$, $\beta = 0.188$, $p = 0.000$), H7 ($ALT \rightarrow VI$, $\beta = 0.219$, $p = 0.000$), H8 ($PI \rightarrow VI$, $\beta = 0.336$, $p = 0.000$), and H10 ($REL \rightarrow VI$, $\beta = 0.136$, $p = 0.015$) show significant positive effects, indicating support for these hypotheses. Specifically, H3 highlights the strong influence of Social Capital (SC) on Perceived Behavioral Control (PBC), while H4, H6, H7, H8, and H10 confirm the positive impacts of Attitude (AT), PBC, Altruism (ALT), Personal Identity (PI), and Religiosity (REL) on Volunteering Intention (VI), with effect sizes ranging from medium to large ($f^2 > 0.02$). In contrast, H5 ($SN \rightarrow VI$, $\beta = 0.067$, $p = 0.088$) and H9 ($PMO \rightarrow VI$, $\beta = -0.067$, $p = 0.064$) are not significant and therefore not supported. The Variance Inflation Factor (VIF) values for all constructs are below the threshold of 5, indicating no multicollinearity concerns. As shown in Figure 1, the model's R^2 value is 0.555, meaning that the model explains 55.5% of the variance in Volunteering Behavior (VB), demonstrating an acceptable model fit and explanatory power.

4.2.4 PLS-Predict

Assessing a statistical model's predictive power is a critical aspect of any study (Shmueli et al., 2019). To facilitate this, Shmueli et al. (2016) developed PLS-Predict, a holdout-sample-based procedure that generates case-level predictions at the item or construct level, enabling the assessment of a model's out-of-sample predictive performance in PLS-SEM. To evaluate predictive power, the PLS-LM values of all items for each construct are examined. By

comparing the Root Mean Square Error (RMSE) values from the PLS-SEM analysis with the naïve LM benchmark (Table 7), it was observed that the PLS-SEM model produced lower prediction errors for the Volunteering Behavior (VB) construct. Most items of VB had PLS RMSE values lower than the corresponding LM RMSE values, indicating that the LM model generated higher prediction errors. Consequently, the VB construct demonstrates strong predictive power, as the majority of its items show superior out-of-sample prediction performance in PLS-SEM compared to the LM benchmark.

Table 6. Hypotheses results

	Relationship	Beta	SE	<i>t</i> -value	<i>p</i> -value	<i>f</i> ²	VIF	LL	UL	D
H1	SC → AT	0.662	0.049	13.528	0.000	0.780	1	0.573	0.733	S
H2	SC → SN	0.551	0.064	8.654	0.000	0.471	1.314	0.440	0.650	S
H3	SC → PBC	0.532	0.069	7.654	0.000	0.479	1.314	0.409	0.638	S
H4	AT → VI	0.139	0.044	3.141	0.001	0.044	2.346	0.070	0.215	S
H5	SN → VI	0.067	0.050	1.352	0.088	0.008	2.896	-0.013	0.149	NS
H6	PBC → VI	0.188	0.052	3.627	0.000	0.062	3.076	0.109	0.280	S
H7	ALT → VI	0.219	0.065	3.386	0.000	0.074	3.499	0.116	0.327	S
H8	PI → VI	0.336	0.082	4.075	0.000	0.113	5.336	0.204	0.473	S
H9	PMO → VI	-0.067	0.044	1.520	0.064	0.010	2.341	-0.138	0.006	NS
H10	REL → VI	0.136	0.063	2.161	0.015	0.034	2.923	0.036	0.242	S
H11	VI → VB	0.745	0.045	16.631	0.000	1.246	1	0.663	0.811	S

Note 1: SC = Social capital, AT = Attitude, SN = Subjective norms, PBC = Perceived behavioral control, VI = Volunteering intention, ALT = Altruism, PI = Personal identification, PMO = Perceived moral obligation, REL = Religion, VB = Volunteering behavior.

Note 2: SE = Standard error, VIF = Variance inflation factor, LL = Lower limit, UL = Upper limit, D = Decision, S = Supported, NS = Not Supported.

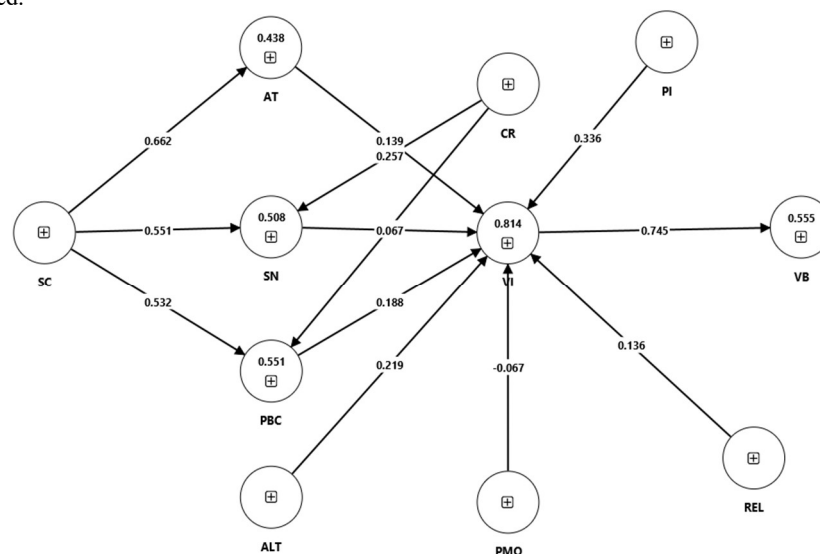


Figure 1. Research Model

Table 7. The results of the predictive power

	Q ² predict	PLS-SEM_RMSE	LM_RMSE	PLS-LM
VB 1	0.497	1.239	1.355	-0.116
VB 2	0.504	1.211	1.362	-0.151
VB 3	0.483	1.287	1.408	-0.121
VB 4	0.450	1.288	1.469	-0.181
VB 5	0.487	1.247	1.390	-0.143

5. DISCUSSION

This study highlights the crucial role of social capital in shaping Malaysian youths' volunteering behavior in flood disaster relief efforts. The findings indicate that social capital positively influences youths' VB, supporting previous research showing its impact on attitudes and prosocial behaviors (e.g., Liang et al., 2020; Ahmed et al., 2022). During disasters, social capital strengthens community resilience. Youths embedded in strong social networks are more likely to develop positive attitudes toward volunteering, recognizing the value of their contributions in rebuilding social cohesion. By participating in flood relief efforts, youths not only mitigate the immediate effects of disasters but also reinforce community ties, fostering pride and a sense of accomplishment.

SC also significantly shapes youths' subjective norms regarding flood disaster relief volunteering. Prior studies have shown that social capital positively influences subjective norms such as expected behaviors in tourism and environmental contexts (Cao et al., 2022; Cahigas et al., 2023). Within disaster contexts, social capital fosters shared values, trust, and reciprocity, which encourage youths to align their behaviors with community expectations and engage actively in relief efforts.

This study further confirms that social capital positively influences perceived behavioral control in volunteering for flood disaster relief among Malaysian youths. Strong social ties within a collaborative environment enhance social capital and promote resource sharing, as noted by Jiang and Ritchie (2017). Social capital strengthens perceived behavioral control because these social connections provide support and empowerment, increasing youths' confidence and sense of capability to contribute effectively to disaster relief. Through social capital, youths gain access to essential resources, guidance, and information, which enhances their perceived ability to take timely and effective action during flood events.

This study supports the TPB, which posits that an individual's attitude positively influences their intention to perform a behavior. The findings indicate that attitude toward volunteering positively affects Malaysian youths' volunteering intention in flood disaster relief efforts. Youths who perceive volunteering as valuable, fulfilling, or socially responsible are more likely to participate in these relief activities. These results align with prior research by Ridzuan et al. (2024b), Ghamdhan et al. (2019), Aseanty et al. (2022), and Hu et al. (2023), all of which found that a positive attitude toward volunteering significantly enhances volunteering intention. Collectively, these studies highlight the critical role of personal attitudes in shaping youths' willingness to engage in volunteer activities, including flood disaster relief efforts.

In this study, perceived behavioral control positively influences volunteering intention, indicating that youths who are confident in their skills, resources, and support systems are more likely to participate in flood disaster relief efforts. This finding is consistent with Khan et al. (2023), who reported that perceived behavioral control positively affects potential volunteer tourists' intention to engage in volunteer tourism programs. Additionally, altruism was found to positively influence volunteering intention among Malaysian youths. Youths motivated by selfless concern for others are more likely to volunteer, driven by a genuine desire to help those

in need. Interestingly, this finding contrasts with Khan et al. (2023), who found that altruism did not significantly affect volunteer tourists' intentions. This discrepancy suggests that the influence of altruism on volunteering intention may vary depending on contextual factors, including cultural background, the type of volunteer activity, and external motivations.

Malaysian youths' personal identity was found to positively influence their volunteering intention in flood disaster relief efforts. This aligns with Cho et al. (2024), who reported that personality traits positively affect donation intention, highlighting the importance of individual characteristics in shaping prosocial behavior. Additionally, religiosity was found to positively influence volunteering intention among Malaysian youths. This finding is consistent with Sallam et al. (2018), who noted that religiosity increases the likelihood of volunteering, and with Al Amirul Eimer Ramdzan Ali and Abd Hamid (2020), who found a positive relationship between religiosity and volunteering intention. These results underscore the role of faith and spiritual values in motivating prosocial behavior, as youths with strong religious beliefs often perceive volunteering as a moral or spiritual duty, inspiring them to assist those in need.

Interestingly, this study found that subjective norms and perceived moral obligation did not significantly influence Malaysian youths' volunteering intention in disaster relief efforts. This contrasts with previous studies (e.g., Salam et al., 2015; Zhong et al., 2022), which reported that individuals are more likely to volunteer when experiencing social or moral pressure. One possible explanation for this difference is cultural and situational factors. Malaysia has a collectivist culture, emphasizing group harmony and relationships, and a high-power distance, where individuals often follow authority figures. These cultural traits typically increase conformity to social expectations. However, in the context of disaster volunteering, particularly among youths, these traits may not strongly affect volunteering intention, suggesting that other motivational factors, such as personal attitudes, altruism, and social capital, play a more prominent role.

Although Malaysia's collectivist culture and high-power distance generally encourage conformity to social expectations (Hofstede, 2001; Triandis, 2018), research suggests that youths may respond differently in prosocial behaviors, such as volunteering. Younger generations in collectivist societies are increasingly influenced by individualistic values, including personal identity, intrinsic motivation, and self-expression, which can diminish the effect of traditional social norms (Schwartz, 2006; Zheng et al., 2021). In the context of disaster volunteering, youths often prioritize personal values such as altruism and self-efficacy over external pressures (Penner, 2002; Omoto & Snyder, 2002). This shift may explain why subjective norms and perceived moral obligation are weaker predictors of volunteering intention among Malaysian youths. Consequently, the interplay of cultural traits and generational change should be considered when examining motivations for youth engagement in disaster relief activities.

The evolving generational landscape further influences volunteering behavior. While older generations in Malaysia tend to emphasize collectivism, social cohesion, and conformity, younger individuals increasingly exhibit hybrid tendencies, balancing collective values with individualistic expression in close-knit contexts. As a result, Malaysian youths may operate

within a unique cultural blend, where personal relevance and self-concept drive action more than generalized social expectations. Supporting this perspective, Othman et al. (2025) found that value-based motivations, such as altruism and personal enhancement, have a stronger influence on youth volunteerism in Malaysia than career-oriented or protective motives. These findings align with the present study, which identified attitudes, perceived behavioral control, altruism, and personal identity as strong predictors of volunteering intention, whereas subjective norms and perceived moral obligation were less influential.

This study also found that volunteering intention positively influences volunteering behavior. In other words, Malaysian youths with a strong intention to volunteer are more likely to engage in concrete actions during flood disaster relief efforts. This indicates that a strong intention to help others motivates youths to translate their intentions into actual volunteering behavior when opportunities arise. These findings align with the TPB, as outlined by Ajzen (1991), which emphasizes that behavioral intention is the most proximal predictor of actual behavior.

6. CONTRIBUTIONS

6.1 Theoretical Contributions

The present study contributes to the understanding of youth volunteering in flood disaster relief by addressing a critical gap in the literature. While previous studies (e.g., Ma et al., 2021; Peek, 2008) have examined volunteers' willingness to participate in disaster preparedness, few have specifically investigated Malaysian youths' engagement in flood disaster relief or the behavioral motivations underlying their participation. This study addresses this gap through the application and extension of the TPB. The original TPB posits that attitude, subjective norms, and perceived behavioral control influence volunteering intention, which subsequently predicts volunteering behavior. However, recent research (e.g., Mouloudj & Bouarar, 2023) indicates that these core constructs alone may not fully capture the complexity of volunteering behavior. To enhance the model's explanatory power, this study extends TPB by incorporating social capital, perceived moral obligation, religiosity, altruism, and personal identification. Integrating these constructs provides a more comprehensive, context-specific framework for understanding the diverse motivations driving youth participation in flood disaster relief. This theoretical extension not only strengthens TPB's explanatory capacity in the disaster volunteering context but also offers a foundation for future research and practical interventions aimed at increasing youth engagement in disaster risk reduction.

By incorporating these additional constructs, the extended TPB provides a more robust and comprehensive framework. It not only predicts volunteering behavior more accurately but also offers deeper insights into the multifaceted motivations driving Malaysian youths and other populations to participate in flood disaster relief. This extended model improves understanding of how social, psychological, and ethical factors interact to influence disaster-related volunteerism. Consequently, it informs the design of targeted interventions and strategies to encourage volunteer participation in disaster relief efforts. Additionally, the present study

refines the conceptualization of subjective norms within TPB. While previous research (e.g., Sallam et al., 2021; Tiraieyari et al., 2019; Zhong et al., 2022) suggests that subjective norms strongly predict volunteering intention, the current findings indicate that subjective norms do not always directly translate into engagement. Instead, subjective norms appear to interact with other psychological factors, challenging TPB's assumption of a straightforward relationship between social pressure and behavioral intention.

6.2 Practical Contributions

The findings of this study provide valuable insights for enhancing volunteer recruitment strategies, improving disaster relief programs, and informing policy development for community engagement. Policymakers and disaster management organizations can use these findings to develop targeted recruitment strategies that emphasize the roles of social capital, altruism, and perceived moral obligation in shaping volunteering behavior. Additionally, universities and NGOs can leverage these insights to design campaigns that align with students' personal identity, values, and perceived behavioral control, thereby increasing participation in volunteering intention and behavior.

Understanding the factors that influence volunteering intention also allows government agencies and humanitarian organizations to structure volunteer programs more effectively. Strategies such as community-based training, peer influence mechanisms, and incorporating moral and religious appeals in volunteer initiatives can enhance engagement in flood disaster relief efforts. These approaches ensure that volunteers are better prepared, motivated, and confident to contribute effectively during emergencies.

Furthermore, the study provides evidence to support policies that promote community-building initiatives, strengthen social capital, and enhance disaster preparedness. Local governments can integrate volunteer promotion into disaster resilience policies, fostering a more effective and coordinated response to natural disasters. By cultivating a culture of volunteerism and community engagement, these policies can improve disaster readiness and relief efforts, ultimately benefiting affected communities and encouraging greater participation in volunteering behavior.

7. CONCLUSIONS

The growing seriousness of climate change has prompted researchers worldwide to examine the factors influencing citizens' engagement in disaster risk reduction activities (Ridzuan et al., 2024c). Within this context, youth play a vital role in disaster risk management during emergency relief due to their energy, adaptability, physical resilience, and technological skills. These attributes enable them to respond quickly and contribute meaningfully through activities such as search and rescue, distributing relief materials, and providing immediate support to affected communities. This study contributes to the literature on prosocial behavior and disaster

volunteering by applying an extended TPB. While TPB has been widely employed in volunteerism research, its application in emergency disaster contexts, particularly among Southeast Asian youth, remains limited. By incorporating contextually relevant constructs such as altruism, religiosity, and personal identification, the study provides a culturally grounded and comprehensive perspective on the factors shaping youth volunteering in post-disaster scenarios.

This study addresses two key gaps. First, it responds to the scarcity of empirical research on youth engagement in flood disaster relief in Malaysia. Second, it extends the application of the TPB by examining volunteering behavior during the relief phase, rather than focusing only on preparedness or general populations. The empirical findings support eight of the ten hypotheses. Social capital positively influences attitude, subjective norms, and perceived behavioral control. In addition, attitude, perceived behavioral control, altruism, personal identification, and religiosity all positively shape volunteering intention, which, in turn, significantly predicts volunteering behavior. Interestingly, traditional TPB predictors such as subjective norms and perceived moral obligation did not significantly affect volunteering intention in this context, highlighting the need to adapt TPB constructs to cultural and situational factors.

Practically, these findings offer valuable implications for stakeholders in policymaking and youth development. For policymakers, the results highlight the importance of fostering social capital and intrinsic motivators when designing youth-focused disaster relief programs. This could involve supporting initiatives that strengthen peer networks and encourage value-driven motivations. Youth organizations and NGOs can use these insights to develop strategies such as community mentoring or identity-based campaigns that enhance perceived behavioral control and promote volunteering intention among young people. Training programs may also integrate values-centered components that emphasize altruism, personal identification, and religiosity to increase youth commitment and participation in relief efforts. By recognizing the limitations of traditional normative messaging, disaster management authorities can better tailor recruitment and communication strategies to focus on personal values and a sense of agency rather than solely appealing to social expectations.

Despite certain limitations, such as the use of a cross-sectional design and convenience sampling, this study provides a solid foundation for future research. Subsequent studies could adopt longitudinal designs to better capture causal relationships or investigate how digital platforms can be leveraged to mobilize youth volunteers (aged 18–40) more effectively. Overall, this research supports a more inclusive and adaptive approach to disaster management, recognizing youth not merely as beneficiaries but as active agents of change who play a vital role in building resilient communities.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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